EXHIBIT F

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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| In re Patent of: | Zou et al. | |
| U.S. Patent No.: | 9,084,199 | Attorney Docket No.: 35548-0127IP1 |
| Issue Date: | July 14, 2015 | |
| Appl. Serial No.: | 10/954,755 | |
| Filing Date: | September 30, 2004 | |
| Title: | UTILIZATION OF OVERHEAD CHANNEL QUALITY METRICS IN A CELLULAR NETWORK | |

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Patent Trial and Appeal Board
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**PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 9,084,199**
**PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42**

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## EXHIBITS

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| EX1001 | U.S. Pat. No. 9,084,199 to Zou et al. ("the '199 patent") |
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| EX1003 | Declaration of Dr. Jonathan Wells, Ph.D. |
| EX1004 | U.S. Patent App. Publication No. 2002/0165004 ("Chen") |
| EX1005 | U.S. Patent App. Publication No. 2004/0110473 ("Rudolf") |
| EX1006 | U.S. Patent App. Publication No. 2003/0156556 ("Puig-Oses") |
| EX1007 | Medium Access Control (MAC) Standard for cdma2000 Spread Spectrum Systems, Release D (3GPP2), v1.0 (Feb. 13, 2004) ("CDMA2000_Spec") |
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| EX1101 | Joint Motion to Enter Scheduling Order (Document 30), *WSOU Investments LLC v. Huawei Technologies Co., Ltd., et al.*, Case Nos. 6:20-cv-00533-00544 (W.D. Tx.) |

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| EX1102 | Huawei's Stipulation served in *WSOU Investments LLC v. Huawei Technologies Co., Ltd., et al.*, Case Nos. 6:20-cv-00533-00544 (W.D. Tx.) |
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| EX1106 | November 3, 2020 Email from the Court re *WSOU Investments LLC v. Huawei Technologies Co., Ltd., et al.*, Case Nos. 6:20-cv-00533-00544 (W.D. Tx.) |

# LISTING OF CLAIMS

| Claim Element | Language |
|---|---|
| [1.P] | A method comprising: |
| [1.1] | generating quality metrics from a decoding process for a received channel quality indicator (CQI), |
| [1.2] | wherein the quality metrics comprise short-term soft decision quality metrics and long-term soft decision quality metrics that are associated with a quality of the received CQI, |
| [1.3] | wherein the long-term soft decision quality metrics are generated by filtering frame based quality metrics over a plurality of frames; |
| [1.4] | comparing at least one of the quality metrics to a quality setting; and |
| [1.5] | determining whether to dynamically adjust a CQI channel configuration based on the comparison. |
| [2] | The method, as set forth in claim 1, wherein the CQI channel configuration comprises a R-CQICH mode setting of a full mode or a differential mode, and the comparison comprises comparing one of the long-term quality metrics to the quality setting. |
| [3] | The method, as set forth in claim 1, wherein the CQI channel configuration comprises a reverse link outer loop power control setting, and the comparison comprises comparing one of the short-term quality metrics to the quality setting. |
| [4] | The method, as set forth in claim 1, wherein the CQI channel configuration comprises a repetition factor, and the comparison comprises comparing one of the long-term quality metrics to the quality setting. |
| [5] | The method, as set forth in claim 1, comprising generating the short-term quality metrics by accumulating a plurality of |

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| | quality information from the decoding process over a CQI frame. |
| [6] | The method, as set forth in claim 1, comprising generating a plurality of erasures for differential reports based on a CQI differential bit decision metric. |
| [7] | The method, as set forth in claim 1, wherein the method is performed at a base station in a wireless communications system. |
| [8] | The method, as set forth in claim 1, comprising transmitting an adjustment for the CQI channel configuration to a wireless unit. |
| [15.P] | A method comprising: |
| [15.1] | generating quality soft decision metrics in a decoding process associated with a quality of the received channel quality indicator (CQI), |
| [15.2] | wherein the soft decision metrics are generated using erasure metrics accumulated over a frame; |
| [15.3] | comparing one of quality soft decision metrics to a threshold quality setting; and |
| [15.4] | determining whether to dynamically adjust at least one of a mode setting, a reverse link outer loop power control setting, or a repetition factor based on the comparison. |
| [16] | The method, as set forth in claim 15, wherein the mode setting comprises a full mode or a differential mode setting. |
| [17] | The method, as set forth in claim 15, comprising transmitting an adjustment to a wireless unit if the determination is to dynamically adjust at least one of the mode setting, the reverse link outer loop power control setting, or the repetition factor. |

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| [18] | The method, as set forth in claim 15, comprising generating long-term metrics by accumulating a plurality of quality metrics over a period of more than one frames. |

Huawei Technologies Co., Ltd. ("Huawei" or "Petitioner") requests *Inter Partes* Review ("IPR") of claims 1-8 and 15-18 ("the Challenged Claims") of U.S. Patent No. 9,084,199 ("the '199 patent").

# I. MANDATORY NOTICES UNDER 37 C.F.R § 42.8(a)(1)

## A. Real Parties-In-Interest Under 37 C.F.R. § 42.8(b)(1)

Huawei Technologies Co., Ltd.; Huawei Device USA, Inc.; Huawei Technologies USA Inc.; Huawei Investment & Holding Co., Ltd.; Huawei Device (Shenzhen) Co., Ltd.; Huawei Device Co., Ltd.; Huawei Tech. Investment Co., Ltd.; and Huawei Device (Hong Kong) Co., Ltd. are the real parties-in-interest. No other parties had access to or control over this Petition, and no other parties funded this Petition.

## B. Related Matters Under 37 C.F.R. § 42.8(b)(2)

WSOU Investments, LLC d/b/a/ Brazos Licensing and Development ("WSOU" or "Patent Owner")—the alleged Patent Owner—filed a first complaint against Petitioner asserting the '199 patent on March 20, 2020 in the U.S. District Court for the Western District of Texas (Case No. 6:20-cv-00205). Patent Owner voluntarily dismissed Petitioner from the first complaint without prejudice on June 17, 2020. On the same day, Patent Owner filed a second complaint at the Western District (Case No. 6:20-cv-00541), again asserting the '199 patent against Petitioner.

This second complaint was one of twelve patent lawsuits filed by Patent

Owner against Petitioner on the same date:

| Asserted Patent No. | Civil Case No. (W.D. Tex.) |
|---|---|
| 6,882,627 | 6-20-Cv-00533 |
| 7,095,713 | 6-20-Cv-00534 |
| 7,508,755 | 6-20-Cv-00535 |
| 7,515,546 | 6-20-cv-00536 |
| 7,860,512 | 6-20-cv-00537 |
| 7,872,973 | 6-20-cv-00538 |
| 8,200,224 | 6-20-cv-00539 |
| 8,417,112 | 6-20-cv-00540 |
| 9,084,199 | 6-20-cv-00541 |
| 8,249,446 | 6-20-cv-00542 |
| 6,999,727 | 6-20-cv-00543 |
| 8,429,480 | 6-20-cv-00544 |

None of the twelve asserted patents are related to the '199 patent as a continuation/divisional. Petitioner is not aware of any disclaimers or reexamination certificates addressing the '199 patent.

### C. Lead And Back-Up Counsel Under 37 C.F.R. § 42.8(b)(3)

Petitioner provides the following designation of counsel.

| Lead Counsel | Backup Counsel |
|---|---|
| Michael T. Hawkins, Reg. No. 57,867<br>Fish & Richardson P.C.<br>3200 RBC Plaza<br>60 South Sixth Street<br>Minneapolis, MN 55402<br>Tel: 612-337-2569<br>hawkins@fr.com | Nicholas Stephens, Reg. No. 74,320<br>Tel: 612-766-2018 / nstephens@fr.com<br><br>Kenneth W. Darby, Reg. No. 65,068<br>Tel: 512-226-8126 / kdarby@fr.com<br><br>Kim Leung, Reg. No. 64,399<br>Tel: 858-6784713 / leung@fr.com<br><br>Stuart Nelson, Reg. No. 63,947 |

| | |
|---|---|
| | Tel: 612-337-2538 / snelson@fr.com<br><br>Craig Deutsch, Reg. No. 69,264<br>Tel: 612-278-4514 / deutsch@fr.com<br><br>Kenneth Hoover, Reg. No. 68,116<br>Tel: 512-226-8117 / hoover@fr.com<br><br>Sangki Park, Reg. No. 77,261<br>Tel: 612-638-5763 / spark@fr.com<br><br>Terry J. Stalford, Reg. No. 39,522<br>Tel: (214) 292-4088 / stalford@fr.com |

### D. Service Information

Please address all correspondence and service to the address listed above. Petitioner consents to electronic service by email at IPR33548-0127IP1@fr.com (referencing No. 35548-0127IP1 and cc'ing PTABInbound@fr.com and hawkins@fr.com).

## II. PAYMENT OF FEES – 37 C.F.R. § 42.103

Petitioner authorizes the Office to charge Deposit Account No. 06-1050 for the fee set in 37 C.F.R. § 42.15(a) and further authorizes payment for any additional fees to be charged to this Deposit Account.

## III. REQUIREMENTS FOR IPR UNDER 37 C.F.R. § 42.104

### A. Grounds For Standing Under 37 C.F.R. § 42.104(a)

Petitioner certifies that the '199 patent is available for IPR, and Petitioner is

not barred or estopped from requesting IPR.

### B. Challenge Under 37 C.F.R. § 42.104(b) and Relief Requested

Petitioner requests IPR of the Challenged Claims on the grounds listed below. A declaration from Dr. Jonathan Wells (EX1003) also supports this Petition.

| Ground | Claims | §103 Combination |
|---|---|---|
| **1A** | 1, 3, 5, 7-8, 15, 17-18 | Rudolf in view of Chen |
| **1B** | 2, 6, 16 | Rudolf in view of Chen and Zhou |
| **1C** | 4 | Rudolf in view of Chen and Puig-Oses |
| **2A** | 1, 3, 5, 7-8, 15, 17-18 | Chen in view of Rudolf |
| **2B** | 2, 6, 16 | Chen in view of Rudolf and Zhou |
| **2C** | 4 | Chen in view of Rudolf and Puig-Oses |

The ’199 patent was filed September 30, 2004 without a priority claim. Petitioner treats September 30, 2004 as the Critical Date for evaluating prior art status:

| Reference | Filing | Publication | Status |
|---|---|---|---|
| **Chen (EX1004)** | 03/15/2001 | 11/07/2002 | §§102(a), (b), (e) |
| **Rudolf (EX1005)** | 12/03/2003 | 06/10/2004 | §§102(a), (e) |
| **Puig-Oses (EX1006)** | 02/21/2002 | 08/21/2003 | §§102(a), (b), (e) |
| **Zhou (EX1010)** | 06/10/2004 | 12/29/2004 | §102(e) |

Rudolf was cited during prosecution, but as detailed below (*infra*, Section

XIII.A), is presented in a new light in Grounds 1(A)-2(C)—particularly, in combination with Chen, which was not cited during prosecution. Puig-Oses was also cited during prosecution, but is applied here only against dependent claim 4.

## IV. SUMMARY OF THE '199 PATENT

### A. Brief Description

The '199 patent generally describes techniques for generating "quality metrics" that indicate a quality of Channel Quality Indicator (CQI) signals received at a base station from a wireless unit. EX1001, Abstract. "[T]he CQI quality metrics may be compared to different thresholds to adjust various system configurations in the base station." *Id.*; *generally* 2:57-3:57, 5:14-7:24, 1:6-11:16, FIGS. 1, 8; EX1003, ¶¶26-27.

### B. Summary of the Prosecution History of the '199 Patent

The '199 patent was filed September 30, 2004. EX1002, 383; EX1003, ¶¶28-31. After a series of rejections/responses, the Examiner mailed a final Office Action on July 22, 2011, rejecting claims based on Duan (EX1009) and Rudolf (EX1005). EX1002, 91-107. The applicant had previously disputed the Examiner's application of Duan to (i) the limitation in independent claim 1 for "long-term soft decision quality metrics are generated by filtering frame based quality metrics over a plurality of frames," and (ii) the limitation in independent claim 17 (issued claim 15) for "soft decision metrics are generated using erasure metrics accumulated over a frame." *Id.*,

115-119. The applicant appealed the rejections, and the Board issued a decision reversing the Examiner's rejections. *Id.*, 25-31. The Board agreed that the cited portions of Duan did not process "frame based quality metrics" as recited in claim 1.[1] *Id.*

Following this reversal on appeal, the Examiner mailed a Notice of Allowance. *Id.*, 7-13. The Examiner's reasons for allowance referred to the Board's decision, but provided no additional specific reasons for allowing the application. *Id.*, 12. However, the record shows that the Examiner erred in allowing the application at this point. *Infra*, Section XIII.A. Had the teachings of Rudolf been fully considered in the combinations with Chen as described in the Petition, the application should not have been allowed.

## V. Level of Ordinary Skill

A person of ordinary skill in the art at the time of the '199 patent (a "POSITA") would have had at least a Master's degree in electrical engineering, computer engineering, computer science, physics, or a related field, with at least 2-

[1] The Examiner withdrew the rejections of claims 17-20 in the Examiner's Answer. EX1002, 47.

3 years of experience in wireless communication networks. Ex-1003, ¶20-21. Additional education could substitute for some experience, and substantial experience could substitute for some of the educational background. *Id.*

## VI. Claim Construction Under 37 C.F.R. §§ 42.104(b)(3)

All claim terms should be construed according to the *Phillips* standard. *Phillips v. AWH Corp*., 415 F.3d 1303 (Fed. Cir. 2005); 37 C.F.R. § 42.100. In the Related Litigation, a *Markman* hearing is scheduled for April 2021. EX1103. Here, there are no instances of lexicography in the '199 patent, and no party has alleged instances of unique, specialized terms in the claims requiring a departure from the plain and ordinary meaning of the claim language. The Board has repeatedly explained that "claim terms need only be construed to the extent necessary to resolve the controversy," and for purposes of the particular Grounds in this Petition, no formal construction is necessary. *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011).

## VII. [GROUND 1A] – Obviousness Based On Rudolf In View Of Chen (Claims 1, 3, 5, 7-8, 15, 17-18)

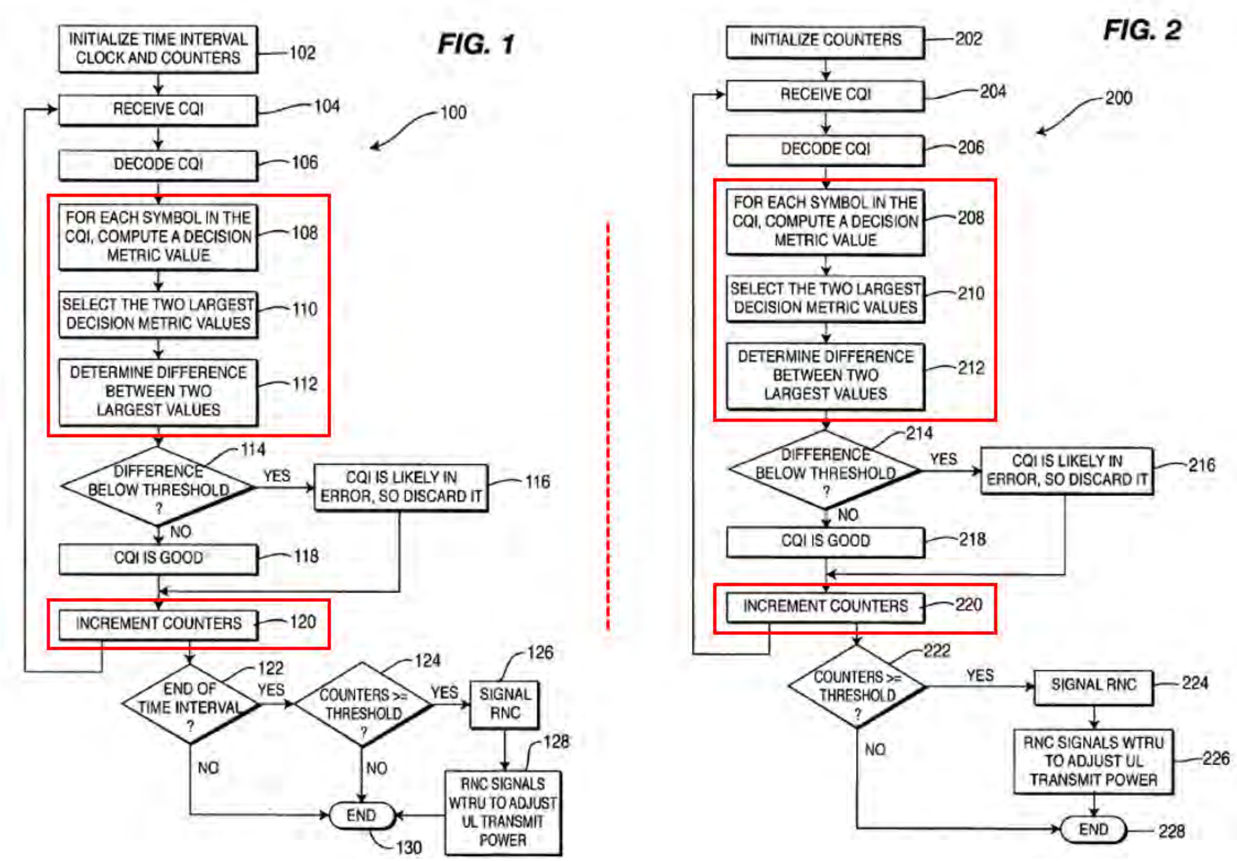
As explained in detail below, the teachings of Rudolf in view of Chen provide all elements of claims 1, 3, 5, 7-8, 15, and 17-18, and would have rendered each of these claims obvious before September 30, 2004. EX1003, ¶32.

***Element [1.P]***

To the extent the preamble is a limitation, Rudolf discloses the recited "method." *See, e.g.*, EX1005, Abstract ("[a] method for improving the reliability of a channel quality indicator (CQI) message in a wireless communications network"), [0028], [0033], FIGS. 1-2; EX1003, ¶44; *see also id.*, ¶¶33-37 (Rudolf overview).

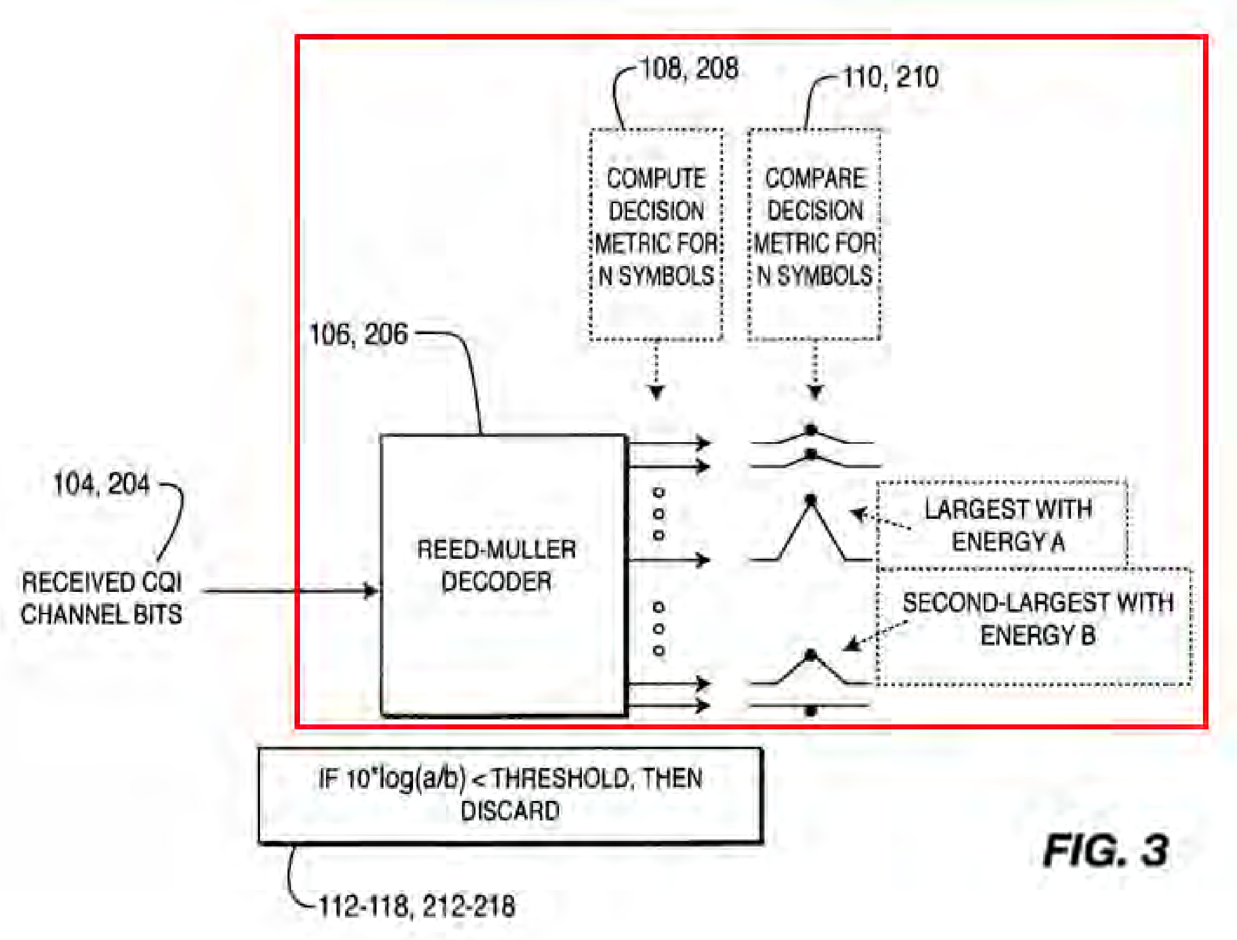
***Element [1.1]***

Rudolf discloses generating various metrics (***quality metrics***), including "decision metric value[s]," "the difference between the two largest values," and "several counters, such as total HS-SICHs received, number of false HS-SICHs received," "number of HS-SICHs that have been missed," and "number of erroneous CQI messages received." EX1005, [0028], Claim 2; *see also* FIGS. 1-2; *infra* Element [1.2].




EX1005, FIGS. 1-2 (annotated).

Rudolf further discloses generating metrics as a part of a "***decoding process***." EX1003, ¶¶45-46. The decoding process includes a "base station convert[ing] a sequence of received channel bits into soft decision metrics" for received CQIs. EX1005, [0037]; *see also* FIG. 3 (showing "decision metrics" generated using a "Reed-Muller Decoder"), [0028]-[0036], [0040], Claims 1-2:




EX1005, FIG. 3 (annotated).

Rudolf also expressly discloses that the decoding process generates quality metrics for "***a received channel quality indicator (CQI)***." EX1005, [0028] ("CQI is received … and decoded", FIG. 3 ("RECEIVED CQI CHANNEL BITS"), Abstract; *generally id.*, [0010]-[0012], [0033], [0034]-[0037] ("CQI is received"), FIGS. 1-2.

***Element [1.2]***

The teachings of Rudolf and Chen would have provided this claim element.

EX1003, ¶¶47-58.

Rudolf discloses that the metrics (***quality metrics***) include "decision metrics value[s]" generated for each symbol[2] of a received CQI and a "difference between the two largest values." EX1005, [0028], [0033], [0040]-[0041], FIGS. 1 (108, 112), 2 (208, 212), Claims 1-2. The 108/208 decision metrics and 112/212 difference metrics each independently provides the recited "***short-term soft decision quality metrics***." EX1003, ¶48.

Rudolf also discloses long-term decision quality metrics, including counts of a "number of false HS-SICHs received," a "number of HS-SICHs that have been missed," over a defined time interval or otherwise or multiple frames. EX1005, [0028]-[0029], [0033]-[0034], [0045], [0047], FIGS. 1 (120) and 2 (220); *see also* [0007], [0010] (describing HS-SICHs). To the extent Rudolf does not expressly describe ***long-term <u>soft</u> decision quality metrics***, Chen demonstrates that such metrics were well known in wireless communications system similar to Rudolf's before the filing date of the '199 patent (September 30, 2004). EX1003, ¶49.

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[2] Rudolf discloses that a "symbol" represents "n information bits" corresponding to a possible CQI word. EX1005, [0036]. "[E]ach symbol has a particular waveform (chip/bit sequence)." *Id.*, [0037].

Chen discloses "[t]echniques to adjust the setpoint of a power control loop in a wireless communication system" such as "cdma2000 and W-CDMA systems." EX1004, Abstract, [0013]. Further, Chen teaches generating "one or more (typically 'soft' or multi-bit) metrics" (***soft quality metrics***) that "provide information indicative of a link condition." *Id.*, [0010]. Chen also teaches how to generate metrics over multiple received frames, thereby providing "***long-term soft decision quality metrics***." *Id.*, [0042] ("The frame status and metrics may also be accumulated for N received frames and used to adjust the setpoint every Nth frame period, where N can be any integer greater than one.").

A POSITA would have found it obvious to modify Rudolf's method to generate long-term soft decision quality metrics, as suggested by Chen. Such a modification of Rudolf in view of Chen's teaching would have predictably entailed, for example, computing long-term versions of Rudolf's soft quality metrics such that the decision whether to adjust the uplink transmit power is based on long-term soft metrics rather than (or in addition to) Rudolf's disclosed counters. EX1003, ¶¶50-51. For example, a predictable long-term soft decision quality metric in the resulting system based on Rudolf in view of Chen would have included metrics that accumulate information regarding the short-term soft decision quality metrics, such as met-

rics that "accumulated" difference values reflecting the actual magnitudes of the differences computed (e.g., at 112/212) over multiple received CQIs or HS-SICHs.[3] EX1005, FIGS. 1-3, [0028]-[0029], [0032]-[0033], [0040]-[0041]; EX1004, [0042], [0065]-[0066] (confirming known option of computing a modified "soft" metric containing additional information than a corresponding conventional metric); EX1003, ¶¶51-52. A POSITA would have been familiar with any number of ordinary operations for accumulating values, such as summing the 112/212 difference values over multiple received CQIs. *Id*. As part of the predictable modification, the "threshold" applied at Rudolf's at steps 124/222 of Rudolf's process would also be proportional to the specific method of accumulation applied as an appropriate cutoff for the decision whether to adjust the CQI channel configuration (e.g., UL power level). *Id*.

As articulated below, multiple reasons would have prompted a POSITA to

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[3] For simplicity, Petitioner refers to the "accumulated" difference values (***long-term soft decision quality metrics***) as "soft" (e.g., multi-bit) counters since the metric would be utilized for decision-making purposes in the Rudolf-Chen system similar to the counters incremented in operations 120/220 of Rudolf. *See* EX1005, FIGS. 1, 2.

modify Rudolf's techniques according to Chen's suggestions (e.g., computing soft-decision quality metrics that reflect magnitudes of differences) such that the resulting system would employ "soft" counters that accumulate information from soft quality metrics (e.g., accumulated difference values) (***long-term soft decision quality metrics***) in its process for monitoring received CQIs. EX1004, [0065]-[0066]; *see also id.*, [0042] ("metrics … accumulated"); EX1003, ¶53.

**First**, Rudolf already recognized the benefit of "soft decision metrics," and even utilized "soft decision metrics" to evaluate received CQIs against each of the possible CQI symbols in operations 108/208. EX1005, [0028], [0033], [0037], [0040]-[0041]. Modifying Rudolf in view of Chen to implement "soft" versions of Rudolf's counters for a time interval would have been a predictable extension of Rudolf's existing use of soft decision quality metrics to further achieve the known benefits recognized elsewhere in Rudolf. EX1003, ¶54.

**Second**, a POSITA would have been led by Chen to extend Rudolf's use of soft decision metrics to realize predictable benefits of soft metrics that were well known long before the filing date of the '199 patent (September 30, 2004). EX1003, ¶55; EX1004, [0046] (Chen describing comparative benefits of "soft" metrics"). The evidence here confirms a POSITA would have known that soft decision metrics typically have higher information content than hard decision metrics (e.g., since hard

decision metrics are ordinarily derived by a process that results in information loss), and soft metrics can thus inform a decision with greater precision than hard metrics in many cases. EX1003, ¶¶55-56. For example, in the context of Rudolf's system, implementing accumulated difference values as "soft" versions of the counters incremented at 120/220 would have led to predictable benefits. In the embodiment depicted in Figure 2, "soft" counters that reflect accumulated magnitudes of the differences computed at 214 would have advantageously allowed the resulting system to react faster to adjust the UL transmit power if the differences are especially large. EX1003, ¶56. In the embodiment depicted in Figure 1, "soft" counters that reflect accumulated magnitudes of the differences computed at 114 would have beneficially allowed the system to detect that the UL transmission power should be increased even if relatively few received CQIs exhibited individual differences sufficient to discard the message (116). EX1003, ¶56. For instance, accumulated difference values would have permitted the system to detect when the differences across a relatively few number of received CQIs are sufficiently large to indicate need for increased UL transmission power adjustment. EX1003, ¶56.

**Third**, Chen expressly teaches the benefit of generating "one or more (typically 'soft' or multi-bit) metrics"—including soft metrics that are based on a difference between the two largest soft metric values for a particular received portion of

decoded data. EX1004, [0065]-[0066] ("includes information indicative of the difference between the best and second best path metrics"). Chen's teaching for modifying a conventional metric to a corresponding soft metric would have suggested to a POSITA that corresponding "soft" versions of Rudolf's counters would have been beneficial to achieve well-known benefits predictably stemming from the use of soft metrics. EX1003, ¶57. Additionally, Chen's suggestion at paragraph [0042] for accumulating metrics over *multiple* frames of decoded data confirmed that accumulating difference values in Rudolf's system over multiple frames for multiple received CQIs would have been a predictable technique. EX1004, [0042]; EX1003, ¶57. Indeed, Chen teaches that accumulating metrics over multiple frames would be beneficial for outer loop power control. EX1004, [0042]. In the predictable combination based on Rudolf in view of Chen, the accumulated difference values would have been similarly applied for outer loop power control. EX1005, FIG. 1 (128), FIG. 2 (226), [0033], [0048].

**Fourth,** a POSITA would have been motivated to implement Rudolf's method according to Chen's suggestion (e.g., generating long-term soft decision quality metrics) since the modification would have involved the mere application of known techniques as disclosed in Chen to a known system as disclosed in Rudolf, and the resulting system would have yielded no more than predictable results. *KSR*

*Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007). Indeed, Rudolf and Chen each discloses adjusting channel configurations in similar types of wireless communications systems (e.g., W-CDMA systems), for a similar purpose (e.g., reduce transmit power consumption, reduce interference, and increase system capacity), and based on similar types of metrics (e.g., soft decision quality metrics, such as the difference between the difference between the two largest soft metric values for a particular received portion of decoded data). Accordingly, a POSITA would have expected a high likelihood of success in implementing the combination. EX1003, ¶58.

***Element [1.3]***

The teachings of Rudolf and Chen would have provided this claim element. EX1003, ¶¶59-63. For example, Rudolf discloses the following about its long-term decision quality metric "counters":

> In one embodiment of the present invention (shown in FIG. 1), counts are taken over 200 ms time intervals. In each frame (which is 10 ms long), there can be at most one HS-SICH received from a WTRU, so therefore there are at most 20 HS-SICHs in 200 ms. All counters are defined from 0 … 20 (total received HS-SICHs, false HS-SICHs, and missed HS-SICHs).

EX1005, [0047].

Rudolf thus confirms that each frame received from a WTRU can include at most one HS-SICH (and thus one CQI), and the counters are programmed to count the number of HS-SICHs received over a plurality of frames. *Id.*

As described above (Element [1.2]), a POSITA would have found it obvious to modify Rudolf in view of Chen such that the base station in the resulting system would maintain long-term soft decision metrics (e.g., "soft" long-term counters) in addition to or alternatively to Rudolf's originally proposed long-term counters). EX1003, ¶61. The "soft" long-term counters would include values indicating an accumulation of the differences computed at operations 112 (FIG. 1) or 212 (FIG. 2) (***frame based quality metrics***) for HS-SICHs and corresponding CQIs received over a plurality of frames. EX1004, [0047], FIGS. 1-2; EX1003, ¶61. This follows from Rudolf's accumulation of counts over a plurality of frames, as described, for example in paragraph [0047] and with respect to Figures 1-2. *Id.*

The operations for generating "soft" long-term counters in the predictable Rudolf-Chen combination further include "filtering frame based quality metrics over a plurality of frames," as recited in element [1.3]. According to Rudolf's Figure 1 embodiment, the counters are generated by filtering numbers of HS-SICHs (and thus CQIs) received or missed over a plurality of frames in a fixed time window (e.g., 200 ms). EX1005, [0047], FIG. 1. Similarly, in Rudolf's Figure 1 embodiment as

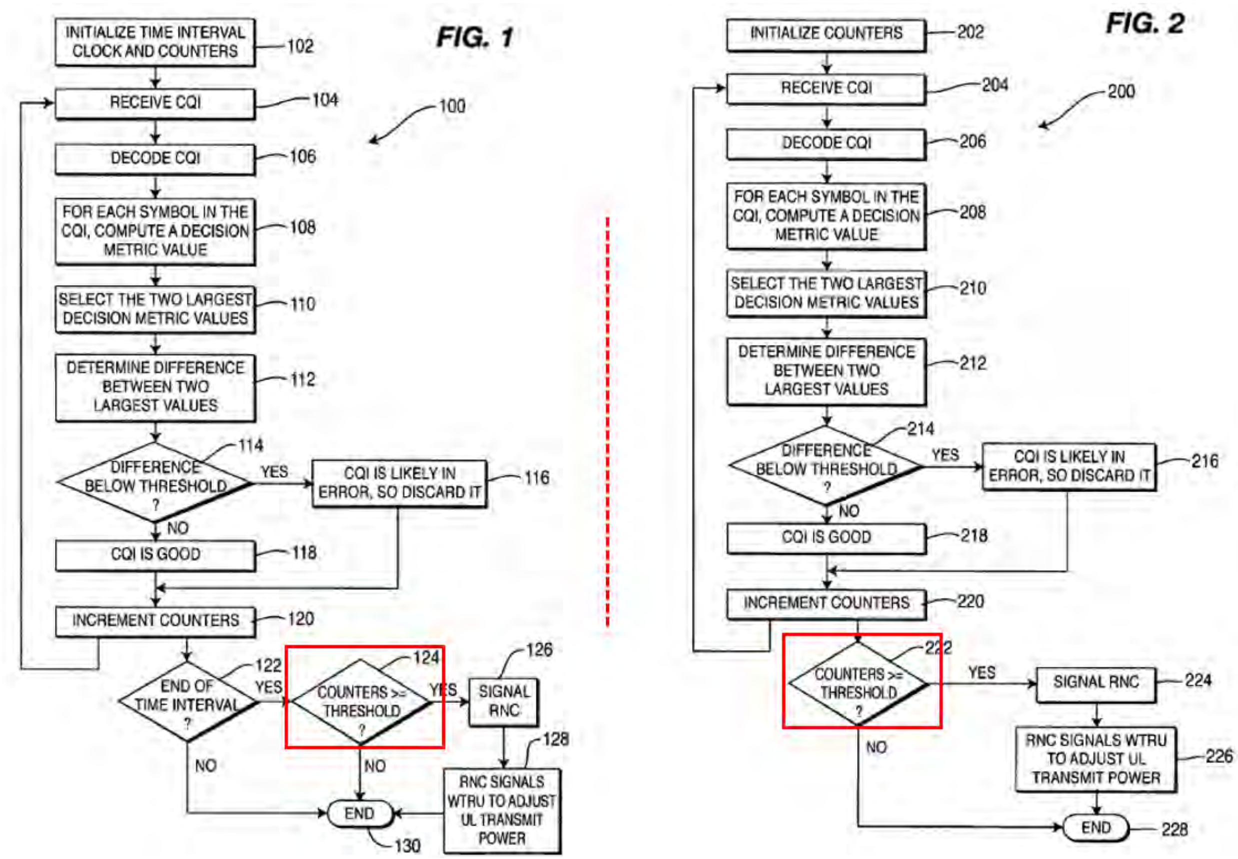
modified by Chen (*supra*, Element [1.2]), the system generates accumulated difference values (***long-term soft decision quality metrics***) by filtering the individual difference values computed at operation 112 (FIG. 1) (***frame based quality metrics***) over a plurality of frames within the time window. EX1003, ¶62.

According to Rudolf's Figure 2 embodiment, the counters are generated by filtering numbers of HS-SICHs received or missed over a plurality of frames until the counters "meet or exceed a threshold value." EX1005, [0034], FIG. 2, claim 2. Similarly, in Rudolf's Figure 2 embodiment as modified by Chen (*supra* Element [1.2]), the system generates accumulated difference values (***long-term soft decision quality metrics***) by filtering the individual difference values computed at operation 212 (FIG. 1) (***frame based quality metrics***) over a plurality of frames. EX1003, ¶63.

***Element [1.4]***

The teachings of Chen and Rudolf would have provided this claim element according to any one of two straightforward options in Rudolph. EX1003, ¶¶64-67.

*First*, Rudolf discloses comparing "counters" (e.g., long-term decision quality metrics) to a "threshold value" (***quality setting***). EX1005, [0030], [0034], FIGS. 1-2; EX1003, ¶65.

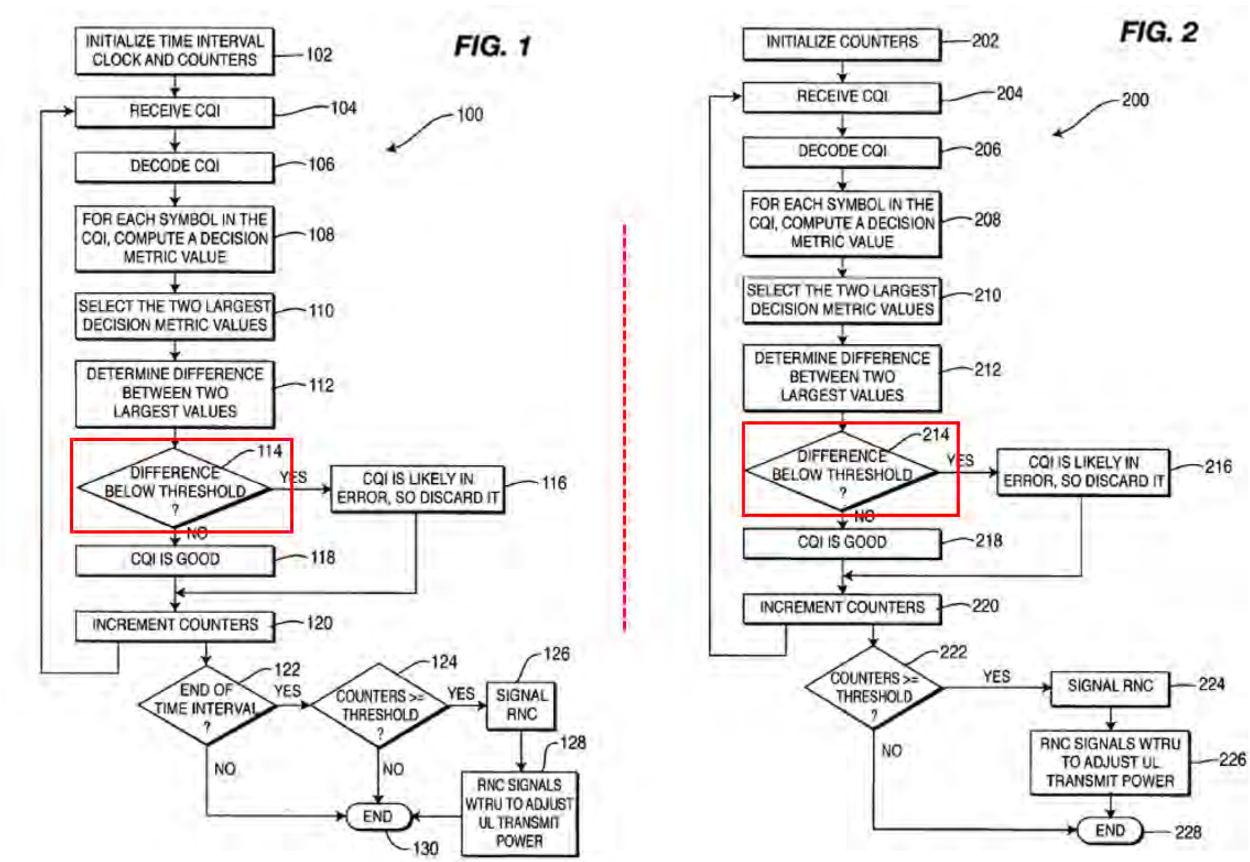



EX1005, FIGS. 1-2 (annotated).

In the predictable combination of Rudolf in view of Chen (*supra*, Element [1.2]), the system would have implemented "soft" counters such as an accumulation of the differences computed at 112 (FIG. 1) or 212 (FIG. 2). EX1003, ¶66. The accumulated differences (a ***long-term soft decision quality metric*** that constitutes ***at least one of the quality metrics***) are then compared to a threshold value according to Rudolf's process at 112 (FIG.1) or 212 (FIG. 2). *Id.*

*Second*, Rudolf discloses, for each received CQI, comparing "[t]he difference between the two largest decision metrics" (a ***short-term soft decision quality metric***

that constitutes ***at least one of the quality metrics***) to a "threshold" (***quality setting***). EX1005, [0028], [0033], [0041]; EX1003, ¶67.



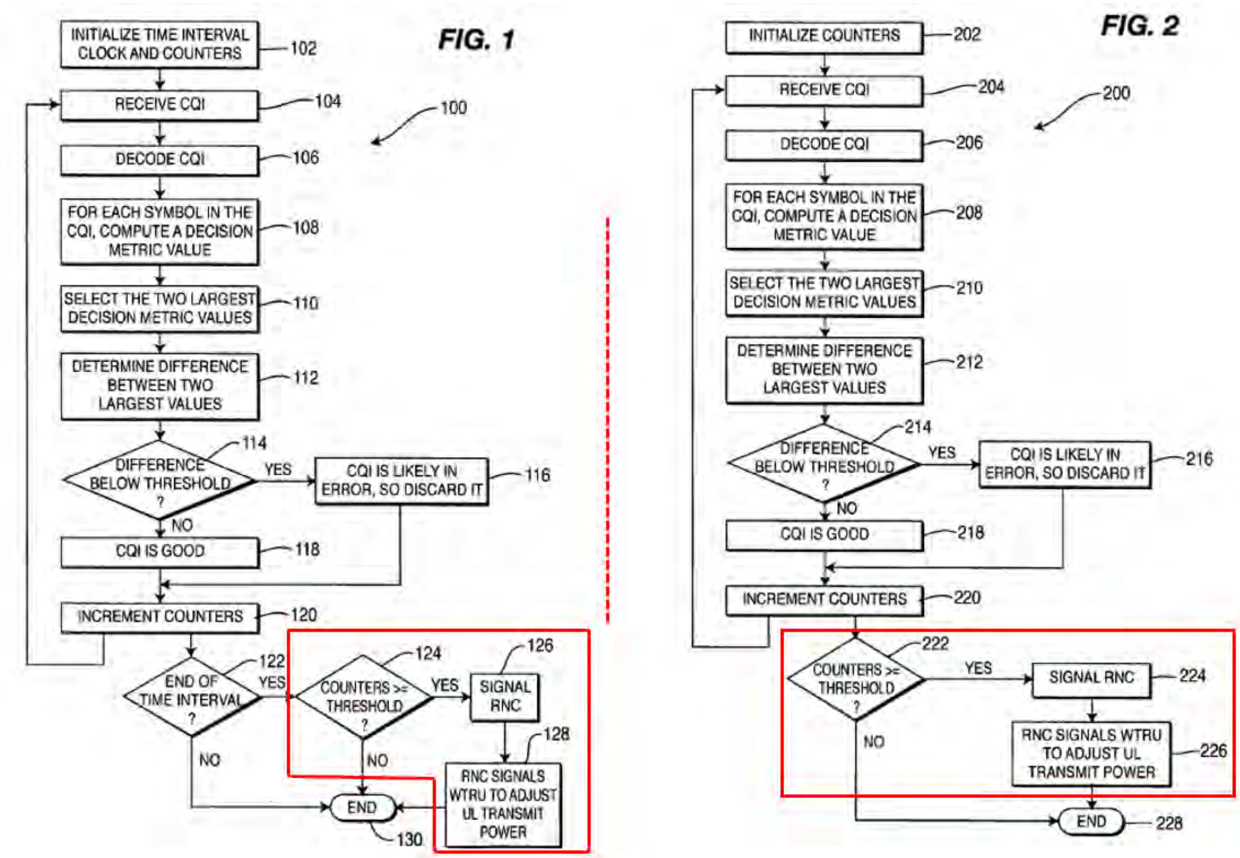

EX1005, FIGS. 1-2 (annotated).

### *Element [1.5]*

Rudolf and Chen provide this claim element considering both of the alternative "comparison[s]" mapped above in the analysis of Element [1.4]. EX1003, ¶¶68-70.

*First*, Rudolf discloses that, based on the comparison of the counters to the

threshold at 124 (FIG. 1) or 222 (FIG. 2), the system determines whether to dynamically adjust an uplink transmission power of the CQI channels (e.g., HS-SICH or HS-DPCCH) channels that carry CQI reports from the WTRU to the base station. EX1005, [0030] ("adjust the UL transmission power"), [0034]-[0035], [0044], [0047] ("changing the power control parameters"), FIGS. 1-2, claim 2; EX1003, ¶69. Adjusting the uplink transmission power of the channels provided for CQI reporting constitutes "***adjust[ing] a CQI channel configuration***," as recited in Element [1.5]. EX1003, ¶69. For the reasons described in detail above (*supra*, Element [1.2]), the Rudolf-Chen system would predictably utilize "soft" counters in substantially the same manner as Rudolf's disclosed counters—i.e., to determine whether to dynamically adjust the uplink transmission power of a CQI channel (***adjust[ing] a CQI channel configuration***). EX1003, ¶69.




EX1005, FIGS. 1-2 (annotated).

*Second*, based on the comparison at 114 (FIG. 1) or 214 (FIG. 2) between the difference in the largest two symbol decision metrics and a threshold, Rudolf's system determines whether to discard the received CQI at 116/216, and increments a counter of a number of erroneous or false HS-SICHs (and thus CQI reports) based on this comparison. EX1005, [0028]-[0029], [0033]-[0034], FIGS. 1-2. Rudolf discloses that the decision whether to the adjust the uplink transmission power is based on the counters, and the counters are further based on the 114/214 comparison; it follows that Rudolf's system determines whether to dynamically adjust the uplink

transmission power control parameters of the CQI reporting channels (a CQI channel configuration) based in part on the 114/214 comparison. EX1005, [0030], [0034]-[0035], [0044], [0047], FIGS. 1-2; EX1003, ¶70. As one example, when the counters are just below the threshold for the 124/222 comparison, the addition of one or more erroneous HS-SICHs to the counters based on the 114/214 comparison would prompt the system to dynamically adjust the uplink transmission power. EX1003, ¶70.

Likewise, the system based on Rudolf in view of Chen would determine whether to dynamically adjust the uplink transmission power of the CQI reporting channels based in part on the 114/214 comparison, since the result of the 114/214 comparison would impact the soft counters in predictable variations of the resulting combination. EX1003, ¶71. For example, based on Rudolf's suggestion to identify erroneous CQI messages based on the 114/214 comparison, and to count the number of erroneous CQI messages received, it would have been obvious in ordinary implementations of the Rudolf-Chen system to accumulate 112/212 differences in a soft counter only for those CQI messages deemed unreliable or erroneous based on the 114/214 comparison. EX1003, ¶71. A POSITA would have sought to accumulate differences of the subset of CQI messages deemed unreliable or erroneous based on the 114/214 comparison to achieve predictable benefits as a matter of design choice,

including gaining an ability to track the magnitude of differences in erroneous CQIs separately from the differences in CQIs that were not deemed erroneous.[4] *Id.* Here, the Rudolf-Chen system would predictably utilize "soft" counters that are based on the 114/214 comparison in substantially the same manner as Rudolf's disclosed counters—i.e., to determine whether to dynamically adjust the uplink transmission power of a CQI channel (***adjust[ing] a CQI channel configuration***). EX1003, ¶71.

***Element [3]***

Rudolf discloses that the CQI channel configuration includes "outer loop power control" for controlling an uplink transmission (***reverse link outer loop power control setting***). EX1005, [0002], [0012], [0028], [0033], [0044], [0048]; EX1003, ¶¶72-73.

Further, as discussed above (Element [1.5]), Rudolf discloses that the determination whether to "signal[] the WTRU to adjust the UL transmission power" for

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[4] In other predictable implementations of the Rudolf-Chen system, a POSITA would have recognized the ordinary option of accumulating differences of all received CQIs in the soft counter (whether rejected/erroneous or not) so as to beneficially allow the soft counter to capture a greater breadth of information even when CQIs are not sufficiently unreliable to be rejected. EX1003, FN1.

transmitting CQIs is made based on a comparison between (i) the "difference between the two largest [decision metric] values") (***short-term quality metric***) and (ii) a "threshold" (***quality setting***). EX1005, [0028], FIGS. 1-3; *supra* Element [1.5].

***Element [5]***

As discussed above (Element [1.2]), Rudolf discloses generating "decision metrics value[s]" and a "difference between the two largest values" (***short-term soft decision quality metrics***). EX1005, [0028]-[0035], FIGS. 1-3; EX1003, ¶74. These metrics are generated by accumulating information such as "the largest decision metric" and "the second largest decision metric" (***quality information***) from a decoding process over a CQI frame. *Id.,* [0031], [0047], FIG. 3 (reproduced below) (showing the "ENERGY A" and "ENERGY B" generated from the output of a "Reed-Muller Decoder):

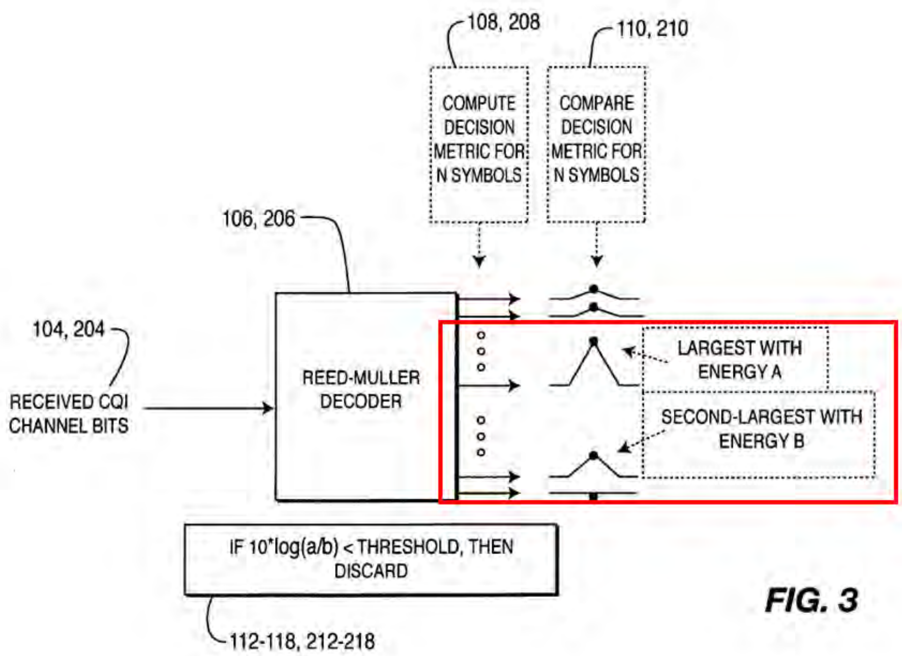


FIG. 3

EX1005, FIG. 3 (annotated).

***Element [7]***

Rudolf discloses that the method is performed at a "base station," (e.g., a "HSDPA base station") in a wireless communications system. EX1005, [0016], [0047]; EX1003, ¶75.

***Element [8]***

Rudolf discloses "signal[ing] the WTRU to adjust the UL transmission power" of the CQI channels (e.g., HS-SICH, HS-DPCCH) (***transmitting an adjustment for the CQI channel configuration to a wireless unit***). EX1005, [0030]; *see also id*, [0012], [0047]; EX1003, ¶76.

***Element [15.P]***

*Supra*, Element [1.P]. EX1003, ¶77.

***Element [15.1]***

As described above (Element [1.1]), Rudolf discloses generating various metrics (***quality soft decision metrics***), including "decision metric value[s]" (e.g., correlation levels), "the difference between the two largest values," and "several counters, such as total HS-SICHs received, number of false HS-SICHs received, [] number of HS-SICHs that have been missed," and "number of erroneous CQI messages received." EX1005, [0028], Claim 2; *see also* FIGS. 1-2. The teachings of Rudolf and Chen provide both short-term and long-term soft decision quality metrics. *Supra*, Element [1.2]; EX1003, ¶78. Additionally, for the reasons described above (Element [1.1]), the quality soft decision metrics in Rudolf (and Rudolf in view of Chen) are generated in a "***decoding process***" associated with a quality of the received CQI. *Supra*, Element [1.1]; EX1005, [0010]-[0012], [0028]-[0037], [0040], FIGS. 1-3; EX1003, ¶78.

***Element [15.2]***

Rudolf discloses that the decision metric values computed at 108/208 are determined based on information such as a correlation between the waveform for a received CQI and a number of pre-defined waveforms corresponding to different possible CQIs (symbols). EX1005, [0037]; EX1003, ¶79; *generally id.*, ¶¶79-85.

For example, Rudolf discloses:

> [T]he decoder can operate like 32 matched filters, with one filter for each symbol, wherein each symbol has a particular waveform (chip/bit sequence). Each matched filter correlates the received waveform with the waveform corresponding to a particular symbol.

EX1005, [0037].

Rudolf discloses that these correlations are used to determine the quality of a particular "CQI word" received on an "HS-SICH" (*Id.*, [0038]), such as whether the CQI word is "very likely [to be] the symbol sent" or "unlikely [to be] the right symbol" (and thus should be "discarded") (*Id.*, [0037], [0041], [0047]). For instance, Rudolf describes that "to determine CQI reliability, ... the ratio of the greatest or largest decision-metric to the second greatest, or the difference between these two metrics in dB (10 log (ratio)) may be used." *Id.*, [0040]. As an example, if the waveform for the received CQI closely correlates with the waveform of a first symbol but not other symbols, the first symbol is likely to be correct. EX1003, ¶¶80-81. Correspondingly, the ratio of the greatest or largest decision-metric to the second greatest, or the difference between these two metrics, will be high. EX1003, ¶81.

Conversely, if a received CQI is corrupt (e.g., due to noise in the transmission path), the correlation between the waveform for the received CQI and the symbol

for the true CQI sequence sent from the WTRU will be diminished. EX1003, ¶82. In this case, the correlation levels are likely to be more similar between (i) the waveform for the received CQI and the waveform for the correct CQI symbol and (ii) the waveform for the received CQI and the waveform for at least one incorrect CQI symbol. The more similar correlation levels render determination of the correct symbol less certain, and thus Rudolf provides that the received CQI should be discarded (e.g., erased) if the difference in correlation levels for the highest two symbols does not meet a minimum threshold. EX1005, [0028]-[0029], [0033]-[0034]; EX1003, ¶82.

According to these and related teachings (*supra*, Element [15.1]), Rudolf provides for generation of soft decision metrics using erasure metrics in least two ways. EX1003, ¶83.

*First*, the decision metric values (e.g., symbol correlation levels) computed at 108/208 in Rudolf's process (FIGS. 1-2) are generated using erasure metrics since the correlation levels between the waveform for the received CQI and the waveforms for each of the candidate CQI symbols are based in part on the number of corrupted or erased bits present in the received CQI. EX1005, [0037]; EX1003, ¶84. As the number of erased bits in the received CQI increases, the correlation of the waveform for the received CQI with the waveform for the true CQI symbol tends to decrease

(and vice versa). EX1003, ¶84. The 108/208 decision metric values (e.g., correlation levels) are thus based on the amount of corrupted/erased information (***erasure metrics***) in the received CQI. *Id.* Moreover, since CQIs are transmitted within frames and the 108/208 decision metric values are computed over a full CQI within a frame, Rudolf's decision metric values are computed using erasure metrics accumulated over a frame, as recited in element [15.2]. EX1005, [0047]; EX1003, ¶84. Petitioner notes that the plain language of this claim element does not require an explicit determination of the erasure metrics, not does it require that the erasure metrics indicate a specific number of erasures. All that element [15.2] recites is that "the soft decision metrics are generated using erasure metrics accumulated over a frame."

*Second*, the 108/208 decision metric values (e.g., correlation levels) can themselves be considered "***erasure metrics***," especially since these values are used to determine the reliability of a received CQI and whether the received CQI should be discarded/erased. EX1005, [0011], [0028], [0033], [0041], FIGS. 1, 2. As these values/correlations (***erasure metrics***) are calculated multiple times for each of several sequences of bits in a frame, the soft decision metric values under this mapping are also calculated using erasure metrics accumulated over a frame. *Id.*, [0028], [0037], [0047]; EX1003, ¶85.

***Element [15.3]***

As described above (Element [1.4]), the teachings of Chen and Rudolf would have provided this claim element according to two alternative mappings. EX1003, ¶¶86-88.

*First*, the comparisons performed at 124 (FIG. 1) and 222 (FIG. 2) in the system resulting from the predictable Rudolf-Chen combination involve comparison of "soft" counter values (long-term ***quality soft decision metrics***) to a threshold (***threshold quality setting***). EX1005, [0030], [0034], FIGS. 1-2; EX1003, ¶87; *supra* Element [1.4].

*Second*, the comparisons performed at 114 (FIG. 1) and 214 (FIG. 2) in Rudolf (and the predictable Rudolf-Chen combination) involve comparison of a short-term ***quality soft decision metric*** to a threshold (***threshold quality setting***). EX1005, [0028], [0033], [0041], FIGS. 1-2; EX1003, ¶88; *supra* Element [1.4].

***Element [15.4]***

For the reasons described in detail above (Element [1.5]), the teachings of Rudolf and Chen disclose determining whether to dynamically adjust an uplink transmission power level for the HS-SICH or HS-DPCCH channels for CQI reporting based on each of the alternative comparisons described in Elements [1.4] and [15.3]. *Supra*, Elements [1.4], [1.5], [15.3]; EX1003, ¶89; EX1005, [0030], [0034]-

0035], [0044], [0047], FIGS. 1-2. Rudolf further teaches that this determination of whether to dynamically adjust the uplink transmission power level relates to dynamically adjusting an "outer loop" power control setting based on the comparison. EX1005, [0002] ("outer power loop control"), [0012], [0028], [0033], [0048], Claims 12, 18; EX1003, ¶89.

***Element [17]***

As discussed above (Element [8]), Rudolf describes "signal[ing] the WTRU to adjust the UL transmission power" (***transmitting an adjustment to a wireless unit if the determination is to dynamically adjust the reverse link outer loop power control setting***). EX1005, [0030]; *see also id*, [0012], [0047]; EX1003, ¶¶90-91.

***Element [18]***

The teachings of Rudolf and Chen would have provided this claim element. EX1003, ¶91. As discussed above (Element [1.2]), a POSITA would have found it obvious to modify Rudolf's method to additionally generate long-term soft decision quality metrics (e.g., "soft" counters), based on Chen's suggestions regarding the benefit of soft decision metrics and accumulating metrics over multiple frames. EX1005, [0028]-[0029], [0033]-[0034], [0047], FIGS. 1 (120) and 2 (220); EX1004, [0042], [0065]-[0066]; EX1003, ¶91.

## VIII. [GROUND 1B] – Obviousness Based On Rudolf In View Of Chen And Zhou (Claims 2, 6, 16)

***Element [2]***

As discussed above (Element [1.4]), the Rudolf-Chen system compares accumulated differences (***a long-term soft decision quality metric***) to a "threshold" (***quality setting***). EX1005, [0028], [0033], [0041]; EX1003, ¶¶64-67, 92-100.

To the extent Rudolf-Chen does not expressly describe determining whether to dynamically adjust ***a R-CQICH mode setting of a full mode or a differential mode***, Zhou demonstrates that dynamically adjusting such a setting in a system similar to Rudolf-Chen's would have been a predictable option before the '199 patent. EX1003, ¶93; *see also id.*, ¶41 (Zhou overview). Zhou discloses that in a CDMA system (e.g., a "cdma2000" system), a "reverse link ... includes a Channel Quality Indication (CQI) channel") (***R-CQICH***) in which each CQI is transmitted as a "full, e.g., 4-bit CQI" (***full mode***) or as a "differential, e.g., 1-bit CQI" (***differential mode***"). EX1010, 1:7-23, 4:19-24, 16:1-17:8, 19:1-31, 20:20, 21:14, FIG. 7. The evidence here confirms it would have been obvious to dynamically switch between full and differential modes in the context of Rudolf-Chen's system based on comparison of long-term soft quality metrics to a quality setting (e.g., Rudolf's accumulated difference values as described above in Elements [1.2] and [1.4]). EX1003, ¶¶94-95. A POSITA would have sought to further modify the Rudolf-Chen system

in view of Zhou to provide adjustments between full and differential modes in the reverse CQI channel for similar reasons that Chen and Rudolf adjust power control settings, e.g., to provide more reliable CQI reporting under certain link conditions as indicated by the long-term quality metrics. *Id.*

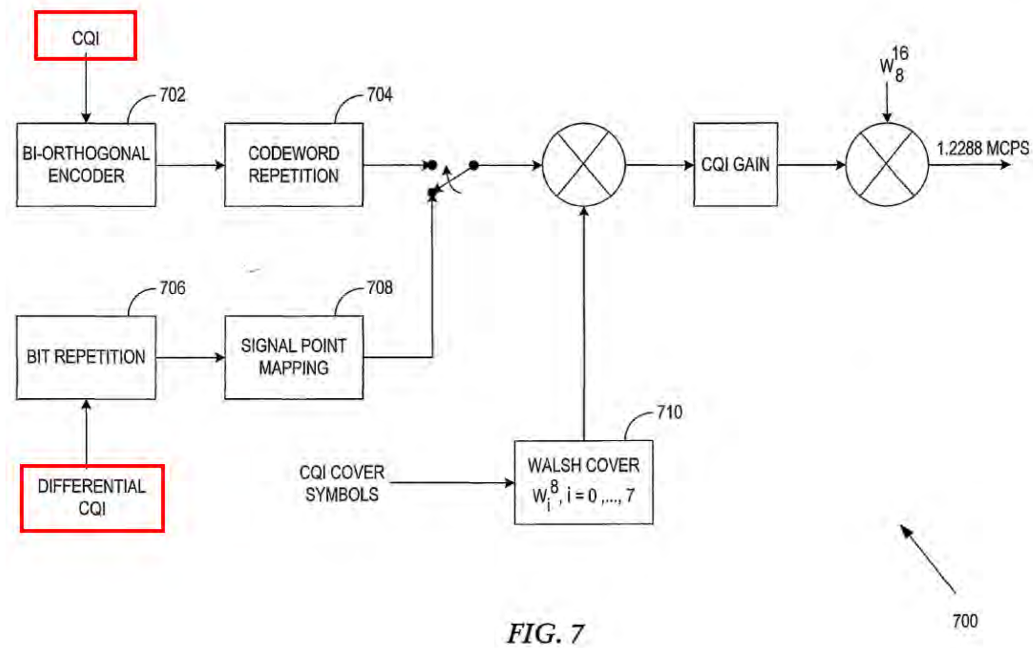


*FIG. 7*

*Id.*, FIG. 7 (annotated).

Additionally a POSITA would have been motivated by additional reasons to further modify Rudolf-Chen's method based on Zhou to adjust an R-CQICH full or differential mode setting based on the comparison of a long-term soft quality metric (e.g., Rudolf-Chen's accumulated difference) to a quality setting. EX1003, ¶95. Dynamically switching to full mode, or determining to remain in full mode rather than differential mode would have increased reliability and reduced likelihood of

accumulation errors that could occur in differential mode. *Id*. The modification is also consistent with Rudolf's and Chen's proposals to adjust a transmission power setpoint, and the modification would have produced no more than predictable results. *Id*., ¶¶96-100.

***Element [6]***

As discussed above (Element [15.2]), Rudolf discloses generation of metrics for determining the quality of a particular "CQI word" received on a CQI channel (e.g., "HS-SICH") (EX1005, [0038]), such as whether the CQI word is "very likely [to be] the symbol sent" or "unlikely [to be] the right symbol" (and thus should be "discarded") (***generating erasures***) (*Id*., [0037]. [0041]). EX1003, ¶¶79-85, 101-106.

Further, Rudolf discloses receiving a CQI, decoding the CQI, and for each symbol in the CQI, computing "a decision metric value." EX1005, [0028]-[0033]. The output of the decoding process aligns with ***a CQI differential bit decision metric*** as described in the '199 patent. *Cf.* EX1001, 10:60-61 ("the demodulated signal [output by demodulation/CQI symbol recovery unit] serves as the differential bit decision metric"); EX1003, ¶102.

Alternatively, to the extent that Rudolf-Chen does not expressly describe ***a CQI differential bit decision metric*** specifically, Zhou demonstrates that generating

such a metric in a system similar to Rudolf-Chen's was a predictable option before the filing date of the '199 patent (September 30, 2004). EX1003, ¶103. Zhou discloses features of a "CDMA2000" system, including a "reverse link ... includ[ing] a Channel Quality Indication (CQI) channel" in which each CQI is transmitted as a "full, e.g., 4-bit CQI" (***full mode***) or as a "differential, e.g., 1-bit CQI" (***differential mode***"). EX1010, 1:7-23, 4:19-24, 16:1-17:8, 19:1-31, FIG. 7. Zhou discloses that a base station receives and decodes a CQI (***CQI differential bit decision metric***), and based on the CQI, determines whether the quality of a channel has (i) "not changed," (ii) "degraded," or (iii) "improved." *Id.*, 19:10-31.

A POSITA would have found it obvious to generate a ***CQI different bit decision metric*** based on the output of Rudolf's decoding process, as Zhou teaches that such a metric can be used to determine whether the quality of channel has changed. EX1003, ¶¶104-106.

To the extent Rudolf-Chen does not expressly describe generating erasures for ***differential reports*** specifically, Zhou demonstrates that generating "differential reports" in a system similar to Rudolf-Chen's was well-known before the filing date of the '199 patent (September 30, 2004). Zhou discloses generation of "a differential CQI" that "decrease[s]" or "increase[s]" a "cumulative CQI value" (***differential report***). EX1010, 19:10-31.

A POSITA would have found it obvious to generate erasures for a ***differential report*** based on the output of Rudolf's decoding process (***CQI differential bit decision metric)***, as Zhou teaches that information regarding a CQI can be presented in either a "full, e.g., 4-bit CQI" or as a "differential, e.g., 1-bit CQI" (in which multiple "differential ... CQI[s]" (***differential reports***) are transmitted in a sequence). EX1003, ¶106.

***Element [16]***

For the reasons explained in detail above (Element [2]), the resulting Rudolf-Chen-Zhou system would have predictably provided for dynamically adjusting a mode setting that comprises a full mode or a differential mode setting. EX1003, ¶107.

## IX. [GROUND 1C] – Obviousness Based On Rudolf In View Of Chen And Puig-Oses (Claims 4, 12)

***Element [4]***

As discussed above (Element [1.4]) Rudolf and Chen teach a system that implements "soft" counters (e.g., an accumulation of the differences computed at Rudolf's 112 (FIG. 1) or 212 (FIG. 2)). EX1003, ¶¶64-67, 108-115. The "soft" counters (***long-term soft decision quality metric*** that constitutes ***at least one of the quality metrics***) are then compared to a threshold value according to Rudolf's process at 112 (FIG.1) or 212 (FIG. 2). *Id.*

To the extent Rudolf-Chen does not expressly describe determining whether to dynamically adjust ***a repetition factor*** of a CQI channel configuration specifically, Puig-Oses demonstrates that such features would have been predictable technique before the filing date of the '199 patent (September 30, 2004). EX1003, ¶109; *see also id.*, ¶42 (Puig-Oses overview). Puig-Oses discloses that in certain systems, such as CDMA2000 or WCDMA, a CQI channel configuration can include an adjustable repetition factor to improve the reliability by which the CQI is transmitted. EX1006, [0011] ("a channel quality feedback message is spread and/or repeated over multiple slots of a CQICH frame. In this embodiment, the reception of the channel quality feedback becomes reliable because of the time diversity over the multiple slots."), [0012], [0025]; EX1003, ¶¶109-110.

A POSITA would have found it obvious to implement Rudolf's method to dynamically adjusting a repetition factor of a CQI channel configuration based on Puig-Oses' suggestion. EX1003, ¶111. Such a modification of the method based on Puig-Oses would have entailed, for example, applying Rudolf-Chen's method for determining whether to adjust a CQI channel configuration (e.g., comparing a "soft" counter to a quality threshold), and if so, adjusting the repetition factor according to which a CQI message is transmitted, as suggested by Puig-Oses. EX1003, ¶111.

Multiple reasons would have prompted a POSITA to implement Rudolf's

method for determining whether to dynamically adjust a CQI channel configuration, specifically to adjust a repetition factor of the CQI channel. EX1003, ¶112.

**First**, Rudolf describes that a comparison between a quality metric and a quality setting is performed to determine the "reliability" of a received CQI. EX1005, [0028]. Further, Puig-Oses teaches that a repetition factor of a CQI channel configuration can be adjusted EX1006, [0014] ("The repetition factors can be carried over the related signaling message..."). EX1003, ¶113

A POSITA would have sought to implement Rudolf's method for determining whether to dynamically adjust a CQI channel configuration, specifically to adjust the repetition factor of the CQI channel configuration, as suggested by Puig-Oses, in order to improve the reliability by which the CQI is transmitted (e.g., under poor link conditions). EX1003, ¶114.

**Second**, Rudolf already proposes dynamic adjustments of the CQI channel configuration to achieve "a higher target UL SIR" that would provide more reliable CQIs. EX1005, [0012], [0015]. While Rudolf's suggestion to increase the uplink power transmission represents one measure the system can take to improve reliability, Puig-Oses recognized that adjustment of the repetition factor also would have been predictable to improve reliability under certain operating conditions. EX1003, ¶115. A POSITA would have sought to apply Puig-Oses technique in the resulting

combination to further Rudolf's objective of increasing reliability of received CQIs. *Id.*

## X. [GROUND 2A] – Obviousness Based On Chen In View Of Rudolf (Claims 1, 3, 5, 7-8, 15, 17-18)

As explained in detail below, the teachings of Chen in view of Rudolf provide all elements of claims 1, 3, 5, 7-8, 15, and 17-18, and would have rendered each of these claims obvious before September 30, 2004. EX1003, ¶32.

***Element [1.P]***

To the extent the preamble is a limitation, Chen discloses the recited "method." EX1003, ¶117; *see also id.*, ¶¶38-40 (Chen overview). *See, e.g.*, EX1004, Abstract ("[t]echniques to adjust the setpoint of a power control loop in a wireless communication system"), [0088], FIG. 7.

***Element [1.1]***

The teachings of Chen and Rudolf would have provided this claim element. EX1003, ¶¶118-128. For example, Chen discloses techniques for generating "one or more (typically 'soft' or multi-bit) metrics" (***quality metrics***) that "provide information indicative of a link condition." EX1004, [0010]. *See also id.*, [0088], FIG. 7 (714).

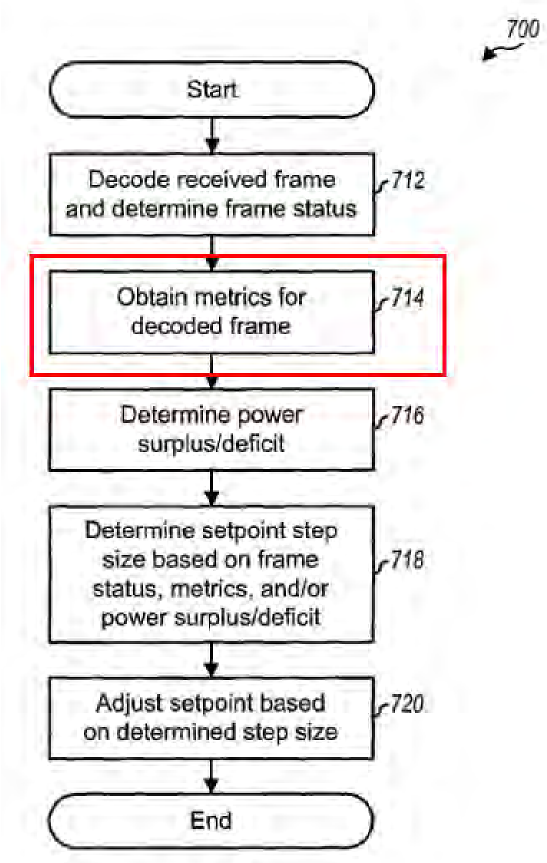


FIG. 7

EX1004, FIG. 7 (annotated).

Chen discloses metrics that are "related to the results of the decoding" of received frame(s) (***decoding process***). *Id.*, [0040]. Example metrics include metrics "for any forward error correcting code (FEC) such as a convolutional code, a Turbo code, a block code, and others," "a re-encoded symbol error rate (SER) and a re-encoded power metric (for all decoders), a 'modified' Yamamoto metric (for a convolutional decoder), minimum or average (log) likelihood ratio (LLR) among bits in the decoded frame and number of iterations before declaring a decoded frame (for a

Turbo decoder), and possibly others." *Id.*, [0011], [0042], [0065]-[0066], [0076]-[0077]. Chen further discloses that its metrics (***quality metrics***) can be generated in the context of various wireless communications systems, such as "cdma2000 and W-CDMA systems." *Id.*, [0013]. Further, Chen teaches that its quality metrics can be generated by a base station based on data received from a remote terminal over a reverse link. *Id.,* [0013], [0034], [0120]; EX1003, ¶¶119-122.

To the extent Chen does not expressly describe generating quality metrics ***for a received CQI***, Rudolf confirms this would have been predictable long before the filing date of the '199 patent (September 30, 2004). EX1003, ¶123. Rudolf discloses "[a] method for improving the reliability of a received message representing quality of a transmission channel in a wireless communication system," for example a wireless communications system that implements "HSDPA" (e.g., a "W-CDMA" system). EX1005, [0007], [0016]. Rudolf's method includes generating metrics regarding a decoded CQI message (e.g., "at least two different values representative of the decoded CQI message") (***quality metrics***) to determine "[t]he reliability of the CQI message." *Id.,* [0017]. EX1003, ¶123.

It would have been obvious to implement Chen's technique for generating quality metrics with respect to received data generally, to determine the quality of a

received CQI specifically, as suggested by Rudolf. EX1003, ¶124. Such a modification would have entailed generating Chen's "one or more (typically 'soft' or multi-bit) metrics" (***quality metrics***), which "are related to the results of the decoding" of a received frame of data, specifically for a received CQI. *Id*. A number of reasons would have prompted a POSITA to combine the teachings of Chen and Rudolf in this manner. *Id*.

**First**, Chen already recognized the benefit of generating metrics (***quality metrics***) for received data, such as to "provide information indicative of a link condition." EX1004, Abstract; EX1003, ¶125. Generating metrics for a specific type of received data (e.g., a received CQI, as taught by Rudolf) would have been a predictable extension of Chen's techniques to achieve these added benefits. EX1003, ¶125.

**Second**, Rudolf describes benefits of determining the "reliability" of a CQIs, specifically, because it permits the system to take action to improve system performance. EX1005, [0011]. For example, based on quality metrics for CQI reports, the system may discard "[e]rroneously received CQIs," increasee "data throughput," avoid a "high level of interference," and improv[e] "efficiency." EX1005, [0011]. A POSITA would have sought to generate Chen's metrics specifically for a received CQI to realize one or more of these benefits expressly taught by Rudolf. EX1003, ¶126.

**Third**, Chen discloses techniques in a CDMA system for "adjust[ing] the set-point of a power control loop." EX1004, [0005], [0009]. Rudolf similarly discloses techniques for adjusting an "UL transmitting power setting," but specifically to improve the reliability of a CQI channel. EX1005, [0016]. A POSITA would have sought to implement Chen's techniques for generating quality metrics in the context of received CQIs as taught by Rudolf to dynamically adjust CQI channel configuration settings such as the UL transmission power in order to attain/maintain a minimum level of quality for received CQIs. EX1003, ¶127.

**Fourth,** a POSITA would have sought to implement the combination because doing so would have involved the mere application of a known technique (e.g., Rudolf's suggestion for monitoring the reliability of CQIs) to a known system (Chen) that was ripe for improvement, and the combination would have yielded no more than predictable results. EX1003, ¶128; *KSR*, 550 U.S. at 417. Indeed, Chen and Rudolf similarly describe techniques for monitoring quality of uplink transmissions using soft quality metrics, and the systems disclosed in both references apply the metrics for similar purposes (e.g., determining a confidence in or a reliability of received data). EX1003, ¶128. Considering these similarities, a POSITA would have expected a high likelihood of success in implementing the combination. EX1003, ¶128.

***Element [1.2]***

Chen discloses that "[v]arious metrics may be used to monitor the quality of the communication channel (i.e., the link condition)." EX1004, [0048]. For example, Chen discloses generating "one or more (typically 'soft' or multi-bit) metrics" (***soft decision quality metrics***), such as a "modified Yamamoto metric," a "minimum or average (log) likelihood ratio (LLR)," and data regarding "frame status." EX1004, [0010]-[0011], [0065]-[0066], [0074]-[0076]; *supra* Element [1.1]; EX1003, ¶¶129-132.

Chen discloses generating quality metrics for a single frame of received data (***short-term soft decision quality metrics***). *See, e.g.*, EX1004, [0042] ("The setpoint can be adjusted for each frame period."), [0072] ("in the decoded frame").

Further, Chen discloses generating quality metrics over multiple frames (***long-term soft decision quality metrics***). *Id.*, [0042] ("metrics may also be accumulated for N received frames"), Claim 1 ("obtaining one or more metrics … for the one ***or more*** received frames") (emphasis added).

As discussed above (Element [1.1]), a POSITA would have found it obvious to implement Chen's technique for generating metrics with respect to received data generally, to determine the quality of a received CQI specifically, as suggested by

Rudolf. These metrics would include metrics associated with a single frame of received data (***short-term soft decision quality metrics***), such as a received CQI, and metrics associated with multiple frames of the received data (***long-term soft decision quality metrics***). EX1003, ¶132.

***Element [1.3]***

As discussed above (Element [1.2]), Chen discloses generating "one or more (typically 'soft' or multi-bit) metrics" for multiple frames of received data (***long-term soft decision quality metrics***). EX1004, [0010]. Moreover, Chen discloses that "frame status and metrics" (***frame based quality metrics***) can be "accumulated for N received frames and used to adjust the setpoint every Nth frame period, where N can be any integer greater than one." *Id.*, [0042]. Chen's long-term soft decision quality metrics are thus generated by filtering "frame status and metrics" (***frame based quality metrics***) over a plurality of frames. For example, the accumulation of metrics over a defined number of frames (N) amounts to a filtering operation that selects "frame status and metrics" for the N frames of a particular time interval, to the exclusion of "frame status and metrics" for frames of other time intervals. EX1003, ¶133.

***Element [1.4]***

As discussed above (Element [1.1]), Chen's system generates "one or more

(typically 'soft' or multi-bit) metrics" (***quality metrics***), such as a "modified Yamamoto metric" and "minimum or average (log) likelihood ration (LLR)." EX1004, [0010]-[0011], [0040], [0042], [0065]-[0066]. Chen also uses metrics to determine an amount of setpoint adjustment (e.g., the "setpoint step size"), and the process for determining the setpoint adjustment involves comparing at least one of the quality metrics to a quality setting. *See, e.g.*, *id.*, [0088], FIG. 7 (718); EX1003, ¶¶134-139.

For example, Claims 1,2 and 10-12 of Chen describe how set point adjustment "is based at least in part on the one or more metrics," and the "step size is determined based at least in part on the confidence in the decoding result as indicated by the one or more metrics." Ex-1004, Claims 1, 2, 10-12. These claims show that Chen compares at least one of the quality metrics from a frame decoding process to a quality setting such as a confidence setting that indicates whether the metrics reflect strong or weak confidence in the decoded results. *Id.*, EX1003, ¶135.

Elsewhere, Chen explains that "frame status, metrics, and power surplus/deficit, or a combination thereof" can be used to determine the setpoint step size. EX1004, [0088], FIG. 7. Thus, one or more quality metrics, either alone or with other factors, are processed to determine an amount of setpoint adjustment necessary to attain a target $E_b/N_t$, target frame error rate (FER), or both by comparing the metric(s) to a quality setting that indicates whether and by how much the setpoint should

be adjusted to achieve the target $E_b/N_t$. Ex-1004, [0089], [0092]-[0094], [0097], [0101], FIG. 4 (424); *see also id.*, [0006], [0036], [0039], [0044]-[0045], [0084]-[0087]; EX1003, ¶136.

Figures 8A-8B and paragraphs [0093]-[0096] of Chen describe techniques for determining a scaling factor for the setpoint adjustment based on an amount of power surplus/deficit. EX1003, ¶137. Moreover, Chen (paragraph [0089]) teaches that "[t]he metrics are typically correlated with the power surplus," and thus it would have been obvious to a POSITA to configure the system to determine a scaling factor from the metrics in addition to or rather than the power surplus/deficit shown in Figures 8A-8B (e.g., to simplify the system and avoid need to explicitly compute the power surplus/deficit). EX1003, ¶137. This predictable variation of Chen's system also would have determined an amount of setpoint adjustment by comparing the metric values to a corresponding quality setting to determine the scaling factor for those metric values. *Id.*

Furthermore, Chen describes in paragraphs [0098]-[0100] and Figures 9A-9B techniques for determine setpoint adjustments based on power surplus/deficit and decoding/quality metrics. EX-1004, [0098]-[0100], FIGS. 9A-9B. The setpoint step size here is determined by comparing the metric value to a quality setting to determine whether and by how much the setpoint should be adjusted. *Id.*; EX1003, ¶138.

Further, a POSITA would have been familiar with simple methods of comparing metrics to quality settings, such as Rudolf's method of comparing quality metrics to threshold values. *See, e.g.*, EX1005, [0030], [0034], FIGS. 1-2; EX1003, ¶139. A POSITA seeking conventional options to simplify an implementation of Chen's system would have been prompted to compare Chen's metrics to threshold settings, as disclosed in Rudolf, to determine whether to adjust a setpoint of a control loop and/or the extent to which the setpoint is adjusted. EX1003, ¶139.

***Element [1.5]***

Chen discloses "adjusting the setpoint" of a power control loop based on "the status of [a] decoded frame (i.e., whether the frame is erased or correctly decoded)" and "[o]ne or more (typically soft) metrics for the decoded frames" (***quality metrics***). EX1004, [0088], FIG. 7 (718-720); EX1003, ¶140. "[I]f a frame is decoded correctly, the received signal quality from the remote terminal is likely to be higher than necessary" and "[t]he setpoint may then be reduced slightly[] …" EX1004, [0040]. "If a frame is decoded in error, the received signal quality at the remote terminal is likely to be lower than necessary" and "[t]he setpoint may then be increased[] …" *Id.* "[I]f the remote terminal detects that no frame was transmitted, the setpoint is not adjusted, unless other metrics are available …" *Id.*; *see also id.*, [0089]-[0092], [0096]-[0102], Abstract, FIG. 4, 8A-8B, 9A-9B. "Any combination of metrics …

may be used to monitor the link condition and adjust the setpoint." *Id.*, [0096]. As described above (Element [1.4]), Chen's setpoint adjustments are further based on the comparison of one or more of the quality metrics to quality settings such as predetermined metric values for different setpoint surpluses/deficits and link conditions (e.g., predetermined values specified in a setpoint step size plot). *Id.*; EX1003, ¶¶140-141. Therefore, Chen discloses determining whether to dynamically adjust a setpoint (***channel configuration***) based on the comparison of at least one of the quality metrics to a quality setting. EX1003, ¶141.

To the extent Chen does not expressly disclose determining whether to adjust a "CQI" channel configuration based on the comparison, this feature would have been obvious based on the teachings of Chen in view of Rudolf. EX1003, ¶142. As described in detail above (Element [1.1]), it would have been predictable to implement Chen's technique for generating quality metrics with respect to received data generally, to determine the quality of a received CQI specifically, as suggested by Rudolf. *Supra*, Element [1.1]. Further as discussed in the analysis of Element [1.1], multiple reasons would have prompted a POSITA to apply Chen's techniques in the context of CQI as suggested by Rudolf. EX1003, ¶142. In the resulting Chen-Rudolf combination, the system would predictably determine quality metrics for CQIs transmitted from a mobile device based on Chen's techniques, and would then use

these metrics to determine setpoint adjustments as disclosed in Chen for channel(s) carrying the CQI report (as suggested in Rudolf). *Id*. The system based on Chen in view of Rudolf would thus determine whether to dynamically adjust a CQI channel configuration (e.g., a reverse link outer loop power control setting) based on the comparison. EX1003, ¶142; *infra*, EX1004, [0013], [0034], [0117], [0120].

A POSITA would have found it obvious to modify Chen in this manner according to Rudolf's suggestions for the same reasons articulated above in Element [1.1]. *Supra*, Element [1.1]; EX1003, ¶¶118-128, 143. For example, the modification would have been a natural extension of Chen's techniques for determining how/whether to adjust channel setpoints to the context of a channel that carries CQI reports as disclosed in Rudolf. *Id*. Additionally, by determining whether to adjust a CQI channel configuration (e.g., the setpoint for outer loop control), the system would achieve benefits expressly taught in Rudolf including the ability to maintain a target quality level for received CQI frames. EX1005, [0012]-[0015], [0047]-[0048]; EX1003, ¶143. In this way, a POSITA would have appreciated that the reliability of CQI reporting can be increased, the number of incorrectly decoded CQI frames can be reduced, and excess transmission resources and power can be diminished when not necessary to achieve a target quality level. EX1003, ¶143.

***Element [3]***

As discussed above (Element [1.5]), a POSITA would have sought to implement Chen's technique for determining whether to adjust the setpoint of a power control loop generally (***dynamically adjusting a channel configuration***), to adjust uplink transmission power settings used to transmit a CQI specifically (***a CQI channel configuration***), as suggested by Rudolf. EX1003, ¶¶144-146.

Chen discloses that a power control loop can include an "outer loop" for controlling transmissions from a remote terminal to a base station (***reverse link outer loop***). EX1004, [0013], [0034], [0117], [0120]. Chen discloses that a setpoint (***control setting***) for the remote terminal can be adjusted using this outer loop. *Id.*

As discussed above (Elements [1.2], [1.4]), Chen discloses generating metrics for a single frame of received data (***short-term soft decision quality metrics***). EX1004, [0042], [0072], [0096]; EX1003, ¶¶129-32, ¶134-39, 146. Chen also discloses comparing at least some of these metrics (***short-term soft decision quality metrics***) to predefined values/distributions (***quality setting***) corresponding to a specified setpoint surplus/deficit to determine a setpoint adjustment (e.g., for the reverse link outer loop). EX1004, [0040], [0089]-[0092], [0096]-[0102], Abstract, FIG. 4, 8A-8B, 9A-9B; EX1003, ¶146; *supra*, Elements [1.2], [1.4].

***Element [5]***

As discussed above (Element [1.2]), Chen's system generates "one or more (typically 'soft' or multi-bit) metrics," which can be computed for individual frames (***short-term quality metrics***)." EX1004, [0010]-[0011], [0042], [0072], [0096]. Chen's metrics can be generated by accumulating information such as "[t]he minimum or average LLR" (***quality information***) from a decoding process over the bits of a frame of data. *Id.*, [0076] ("[t]he minimum or average LLR among the bits in the decoded frame ... may be used as a metric"). *Id.*, [0076]; *see also* [0065]-[0066] (generating modified Yamamoto based on "path metrics" computed over frame). EX1003, ¶147. Further, as discussed above (Element [1.1]), a POSITA would have found it obvious to implement Chen's technique for generating metrics with respect to received data generally (e.g. a frame of received data), to determine the quality of a received CQI (***CQI frame***) specifically, as suggested by Rudolf. EX1003, ¶147. The resulting Chen-Rudolf system would accumulate a plurality of quality information from the decoding process (as taught by Chen) over a CQI frame (as taught by Rudolf). EX1003, ¶147; *supra*, Element [1.1].

***Element [7]***

Chen discloses that the method can be performed at a base station in wireless communications system (e.g., to adjust the setpoints of a reverse link transmission).

EX1004, [0013], [0034], [0120]; *see also id.*, [0004], [0024]-[0027], FIGS. 1-2 (base station); EX1003, ¶148.

***Element [8]***

As discussed above (Element [1.5]), a POSITA would have found it obvious to implement Chen's technique for determining whether to adjust the setpoint of a power control loop generally (***adjust a channel configuration***), to adjust uplink transmission power settings for a CQI channel specifically, as suggested by Rudolf. EX1003, ¶¶149-150. Chen also discloses setpoint adjustments for "reverse link power control." EX1004, [0120]; *see also* [0013], [0034], FIG. 7; *supra*, Element [7].

A POSITA would have understood that adjusting reverse link power would entail transmitting from the base station to a wireless unit control signals indicating the adjustment. EX1003, ¶150. To the extent this transmission is not expressly disclosed in Chen, Rudolf confirms that the base station in similar CDMA systems can "signal the WTRU to adjust the UL transmission power" of reverse link CQI channels (***transmitting an adjustment for the CQI channel configuration to a wireless unit***). EX1005, [0030]; *see also id*, [0012], [0047]. It would have been obvious to configure Chen's system to transmit an adjustment for UL transmission power to a wireless unit according to Rudolf's suggestion both because it would have enabled

the desired reverse link power adjustment, and because wireless transmissions was the ordinary method of exchanging control signals between the base station and wireless unit in a CDMA system. EX1003, ¶150.

***Element [15.P]***

*Supra*, Element [1.P]. EX1004, claim 1. EX1003, ¶151.

***Element [15.1]***

As discussed in detail above (Element [1.1]), Chen generates "one or more (typically 'soft' or multi-bit) metrics" (***quality soft decision metrics***) that "provide information indicative of a link condition." EX1004, [0010]. *See also id.*, [0088], FIG. 7 (714); EX1003, ¶¶152-153. Chen's metrics include both short-term and long-term quality soft decision metrics. EX1004, [0010]-[0011], [0042], [0065]-[0066], [0074]-[0076], Claim 1; *supra*, Element [1.2].

Further, Chen discloses that its metrics "relate[] to the results of the decoding" of received frame(s) (***decoding process***). EX1004, [0040], [0042], FIG. 7; *see also id.*, [0011], [0065]-[0066], [0076]-[0077]; EX1003, ¶153; *supra*, Element [1.1]. To the extent Chen does not expressly describe the full breadth of Element [15.1], Rudolf demonstrates that generating quality soft decision metrics associated with a quality of a received CQI was known before the filing date of the '199 patent (September 30, 2004). EX1004, [0028]-[0036], [0040], FIGS. 1-3. It would have been

obvious to modify Chen in view of Rudolf to generate metrics in a decoding process associated with a quality of a received CQI for the reasons described above. *Supra*, Element [1.1]; EX1003, ¶153.

***Element [15.2]***

As discussed above (Elements [1.1], [15.1]), Chen discloses generating "one or more (typically 'soft' or multi-bit) metrics" (***quality soft decision metrics***), such as a "modified Yamamoto metric," a "minimum or average (log) likelihood ratio (LLR)," and data regarding "frame status." EX1004, [0010]-[0011], [0065]-[0066], [0074]-[0076]. EX1003, ¶¶118-128, 152-155. Further, Chen discloses that certain quality soft decision metrics (e.g., a minimum or average LLR) include information indicative of whether "a frame is received in error" (***erasure metrics***) indicating that they should be erased. *Id.*, [0040] ("For each received frame, a determination is made whether the frame was decoded ... in error (erased) ..."). EX1003, ¶154. By computing over a frame, these quality metrics are generated using erasure metric accumulated over a frame. *Id.*

Moreover, Chen discloses that at least some of the quality metrics (e.g., a minimum or average LLR) can be calculated by accumulating information indicative of a number of bits in the frame received in error (***erasure metrics***). EX1004, [0076] ("[t]he minimum or average LLR among the bits in the decoded frame ... may be

used as a metric.”). EX1003, ¶155. These techniques provide an independent basis by which Chen generates soft decision metrics using erasure metrics accumulated over a frame. *Id.*

***Element [15.3]***

As discussed above (Element [1.4]), Chen and Rudolf disclose comparing at least one quality soft decision metric to a threshold quality setting. The threshold quality settings include, for example, predefined metric value(s) in a setpoint step size plot, threshold confidences, or simple thresholds as disclosed in Rudolf at steps 114/214 and 124/222. EX1004, [0040], [0089]-[0092], [0096]-[0102], Abstract, FIG. 4, 8A-8B, 9A-9B; EX1005, [0028]-[0036], FIGS. 1-3; EX1003, ¶156; *supra*, Elements [1.2], [1.4].

***Element [15.4]***

As discussed above (Elements [1.5], [3]), Chen and Rudolf disclose determining whether to dynamically adjust a reverse link outer loop power control setting based on the comparison between soft decision quality metrics to a threshold quality setting. EX1004, [0013], [0034], [0088], [0117], [0120], FIG. 7 (718-720); EX1005, [0002], [0012], [0028], [0033]; [0048]; EX1003, ¶157; *supra*, Elements [1.5], [3], [15.3].

***Element [17]***

Chen and Rudolf discloses transmitting an adjustment to a wireless unit if the

determination is to dynamically the reverse link outer loop power control setting. EX1004, [0120] ("reverse link power control"); EX1005, [0012], [0030], [0047]; EX1003, ¶158; *supra*, Elements [8], [15.4].

***Element [18]***

Chen discloses generating "one or more (typically 'soft' or multi-bit) metrics" (EX1004, [0010]) for multiple frames of received data (***long-term soft decision quality metrics***) by "accumulat[ing] ... [metrics] for N received frames ..., where N can be any integer greater than one" (***accumulating a plurality of quality metrics over a period of more than one frames***). *Id*., [0042]; EX1003, ¶159.

## XI. [GROUND 2B] – Obviousness Based On Chen In View Of Rudolf And Zhou (Claims 2, 6, 16)

***Element [2]***

As discussed above (Element [1.5]), Chen and Rudolf teach determining whether to dynamically adjust a CQI channel configuration based on a comparison between at least one quality metric to a quality setting. EX1003, ¶¶140-143. Further, as discussed above (Element [1.2]), Chen describes that at least one of these quality metrics can be generated for multiple frames of received data (***long-term soft decision quality metrics***). EX1003, ¶¶129-132, 140-143; *supra*, Elements [1.2], [1.5]. To the extent Chen and Rudolf do not expressly disclose the recited determination whether to dynamically adjust ***a R-CQICH mode setting of a full mode or a***

***differential mode***, as discussed above in Section IX (Element [2]), Zhou demonstrates that dynamically adjusting such a setting in a system similar to Chen-Rudolf's (e.g., a CDMA2000 system) would have been a predictable option before the '199 patent, and it would have been obvious in the context of a system based on Chen-Rudolf to dynamically adjust the full mode or differential mode setting of the reverse CQI channel by comparison of the long-term soft decision quality metrics as discussed above (Element [2], Section IX). EX1003, ¶¶160-168; EX1010, 1:7-23, 4:19-24, 16:1-17:8, 19:1-31, FIG. 7.

***Element [6]***

As discussed above (Element [15.2]), Chen-Rudolf teaches generating metrics for a received CQI, including information indicative of whether "a frame is received in error," and thus should be erased (***generating erasures***). EX1004, [0076]; *supra*, Element [15.2]. Chen teaches that the metrics "relate[] to the results of [] decoding" a received frame. EX1004, [0040], FIG. 7 (712-714). EX1003, ¶169. The output of the decoding process aligns with ***a CQI differential bit decision metric*** as described in the '199 patent. *Cf.* EX1001, 10:60-61 ("the demodulated signal [output by demodulation/CQI symbol recovery unit] serves as the differential bit decision metric"); EX1003, ¶169.

Alternatively, to the extent that Chen-Rudolf does not expressly describe ***a***

***CQI differential bit decision metric*** specifically, as discussed above in Section IX (Element [6]), Zhou demonstrates that generating such a metric in a system similar to Chen-Rudolf's (e.g., a CDMA2000 system) was well-known before the filing date of the '199 patent (September 30, 2004). EX1003, ¶170; *supra*, Section IX, Element [6].

To the extent Chen-Rudolf does not expressly describe generating erasures for differential reports specifically, as discussed above in Section IX (Element [6]), Zhou demonstrates that generating "differential reports" in a system similar to Chen-Rudolf's (e.g., a CDMA2000 system) was well-known before the filing date of the '199 patent (September 30, 2004). EX1003, ¶171; *supra*, Section IX, Element [6].

Element [16]

For the reasons explained in detail above (Element [2]), the resulting Chen-Rudolf-Zhou system would have predictably provided for dynamically adjusting a mode setting that comprises a full mode or a differential mode setting. EX1003, ¶¶172-173.

## XII. [GROUND 2C] – Obviousness Based On Chen In View Of Rudolf And Puig-Oses (Claims 4, 12)

### *Element [4]*

As discussed above (Element [1.5]), the Chen-Rudolf system would predictable determine whether to dynamically adjust a CQI channel configuration based on

comparison between at least one quality metric to a quality setting. *Supra*, Element [1.5]; EX1003, ¶¶140-143. Chen further describes accumulating at least one of the quality metrics over multiple received frames (***long-term soft decision quality metrics***). *Supra*, Element [1.2]-[1.3]; EX1004, [0042]; EX1003, ¶¶175-178.

To the extent Chen and Rudolf do not expressly disclose dynamically adjusting *a repetition factor* of a CQI channel configuration specifically, as discussed above in Section IX (Element [4]), Puig-Oses demonstrates that such features would have been predictable in a system similar to Chen-Rudolf's (e.g., a CDMA2000 system) before the filing date of the '199 patent (September 30, 2004). EX1003, ¶¶175-178; *supra*, Section IX, Element [4].

## XIII. DISCRETIONARY CONSIDERATIONS

### A. The Petition's New Prior Art and Errors Made During Prosecution Warrant Institution—35 U.S.C. § 325(d)

An objective analysis guided by the *Becton* factors under the Board's two-part *Advanced Bionics* framework distinguishes this Petition from others where the Board has denied institution pursuant to 35 U.S.C. § 325(d). *See Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 (PTAB Feb. 13, 2020) (precedential); *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 (PTAB Dec. 15, 2017) (precedential as to Section III.C.5, first paragraph). As discussed below, the prior art combinations of

Grounds 1A-2C are new, and the Examiner made material errors during prosecution that led to allowance of the '199 patent's overly broad Challenged Claims.

#### 1. Part 1 (*Becton* Factors [a], [b], [d]) Grounds 1(A)-2(C) Present New References and Arguments

Rudolf, while applied against the Challenged Claims during prosecution, is presented in a new light in Grounds 1(A)-2(C).

For context, the Examiner asserted Rudolf for the first time in an Office Action mailed February 2, 2011, in an obviousness rejection based on Duan (EX1009) in view of Rudolf. EX1002, 123-136. The Examiner narrowly tailored reliance on Rudolf to its teaching of generating quality metrics "from a decoding process" (Elements [1.1], [15.1]). *Id.*, 127. The Examiner explained that Duan already taught short-term and long-term soft decision quality metrics associated with a quality of a received CQI—but turned to Rudolf to show that Duan's metrics could be generated "from a decoding process." *Id.*, 126-127. The scope of the Examiner's reliance on Rudolf never expanded through a subsequent office action or appeal. *Id.*, 95-105, 45-56.

This Petition applies materially different prior art and arguments from those the Examiner considered during prosecution. Grounds 1(A)-1(C) start with Rudolf as a primary reference, based on the recognition that Rudolf provides teachings rel-

evant to *all* limitations of independent claims 1 and 15—not just the "decoding process" as the Examiner narrowly cited. Rudolf's techniques for monitoring the reliability of a CQI channel is also substantially different from Duan's techniques for "manag[ing] variable data rate communication channels," and thus Rudolf is neither cumulative nor redundant. EX1009, Abstract. The file history indicates that the Examiner also had not considered the pertinent teachings of Chen, or the predictable application of Chen's teachings to modify Rudolf so as to generate "soft" counters as described in Grounds 1(A)-1(C). *Supra*, Section VII (Element [1.2]).

This Petition's reliance on Rudolf in in Grounds 2(A)-2(C) is also materially different from the Examiner's use of Rudolf during prosecution. For instance, Grounds 2(A)-2(C) demonstrate reasons a POSITA would have found it obvious to modify Chen's techniques for adjusting channel configuration generally to a CQI channel specifically, based on Rudolf. In contrast, the Examiner's rejection was premised on Duan's CQI and Rudolf's "decoding" process. *Id.*, 126-127. Very little overlap thus exists between the prior art and arguments cited in this Petition.

#### 2. Part 2: (*Becton* Factors [c], [e]) Examination Errors Material to Patentability

The Examiner appears to have committed at least two critical errors that led to allowance of the Challenged Claims.

First, the file history contains no indication that the Examiner recognized Rudolf's relevance beyond the narrowly cited disclosure regarding generation of quality metrics from a "decoding process" for a CQI. *Supra*, Section IV.B. By any measure, the Examiner's reliance on Rudolf was exceedingly limited. Beyond citing Rudolf for the "decoding process" limitation, neither the Examiner, the applicant, nor the Board substantively addressed Rudolf through two office actions and an appeal. *E.g.,* EX1002, 24-126. The primary dispute instead related to Duan's applicability to Claim 1's "filtering" of frame-based quality metrics. *Id.*

Second, the Examiner appears to have erred in immediately allowing the application following reversal of the Duan-Rudolf rejection on appeal. *Id.*, 7-14, 24-32. The Board's decision on appeal narrowly focused on the "pivotal issue" of whether Duan provided "filtering" of frame-based quality metrics over multiple frames. *Id.*, 27-28. The Board determined that the Examiner's reliance on Duan for this specific feature was in error—but it did not consider Rudolf's applicability to other claim limitations in the manner of Grounds 1(A)-2(C) in this Petition. There is no indication in the file history that the Examiner reconsidered Rudolf following the appeal. The Examiner's reasons for allowance (EX1002, 12) referred generally to the Board's decision, but provided no specific additional reasons for allowing the claims over Rudolf or other prior art. It is also unclear why the Examiner did not

cite Chen, let alone consider its teachings in combination with Rudolf.

For each of these reasons, the ’199 patent is ripe for review.

### B. *Fintiv* Factors Weigh in Favor of Institution—35 U.S.C. § 314(a)

In *Apple Inc. v. Fintiv, Inc.*, the Board enumerated six factors that provide a “holistic view” as to “whether efficiency, fairness, and the merits support the exercise of authority to deny institution in view of an earlier trial date in [a] parallel proceeding.” IPR2020-00019, Paper 11 at 2-3 (PTAB “precedential” Mar. 20, 2020) (“*Fintiv I*”). Guided by precedent, Petitioner took affirmative steps to promote the Board’s efficiency and fairness goals.

**Relevant Facts**—On June 17, 2020, Patent Owner filed twelve separate infringement actions against Petitioner involving twelve unrelated patents asserted against dozens of unrelated products. *See* EX1100. These twelve lawsuits are concurrently pending in the Western District of Texas (“the Court”) before the Honorable Judge Alan D. Albright. *Id*. The action involving the ’199 patent was assigned Case No. 6:20-cv-00205 (“the Related Litigation”). The remaining eleven lawsuits are identified by different cases numbers and are not formally consolidated.

Patent Owner served its preliminary infringement contentions on October 9, 2020. *See* EX1101, 8, 14. Petitioner’s preliminary invalidity contentions are due December 7, 2020. *Id*. On November 30, 2020, Petitioner stipulated in the Related

Litigation that, if *inter partes* review is instituted on Grounds 1(A)-2(C) in this proceeding, Petitioner will not pursue in the Related Litigation the same Grounds 1(A)-2(C) from this IPR, *nor any other possible prior art printed publication grounds based on any reference* from these IPR Grounds. *See* EX1102.

The Court set a *Markman* hearing for April 15, 2021, and the parties are scheduled to exchange terms for construction on December 21, 2020. *See* EX1103; EX1101, 9, 15. Per the Court's default order, fact discovery will formally open on April 19, 2021, one business day after the *Markman* hearing. *See* EX1104, 9.

For purposes of planning earlier dates throughout discovery, etc., the Court set a placeholder trial date for all twelve cases on the same day—April 11, 2022—but promptly informed the parties that "the Court does not intend of trying all 12 patents in one trial." EX1105, 1. In other words, a jury trial is scheduled for April 11, 2022, but neither the Court nor any party knows which one of the twelve asserted patents will be the subject of the trial on that date. This placeholder trial date was set for all twelve cases "due to logistics and to provide flexibility" up through the *Markman* stage, but there is significant uncertainty as to whether the '199 patent will be the subject of a jury trial starting on April 11, 2022 or a much later jury trial. *Id.*

The parties were also informed that the Court "currently has no intention of

consolidating" the twelve lawsuits for a jury trial. EX1106, 1. In this communication, the Court acknowledged the possibility that a subset of "certain patents" among the twelve patents "may" be consolidated. *Id.* But again, even in those circumstances, there is significant uncertainty as to whether the '199 patent will be grouped in that possible subset of "certain patents" and whether that subset will be the subject of a jury trial starting on April 11, 2022 or a much later trial date. *Id.*

Given the filing date of this Petition, the Board's Institution Decision and Final Written Decision will likely issue in early June of 2021 and 2022, respectively.

**Factor 1 (Stay)**—No party in the Related Litigation has requested a stay at this time. Petitioner currently plans to seek a motion to stay after the Board's decision to institute IPR here because, in Judge Albright's court, a motion filed earlier would be premature. Again, the facts at play here are unique. There are twelve distinct lawsuits (asserting twelve unrelated patents) all unrealistically scheduled for trial on the same date. In such unique circumstances, it is unclear how Judge Albright would rule on a motion to stay for the particular lawsuit involving the '199 patent, especially after IPR is instituted against the '199 patent. This cloud of uncertainty means Factor 1 is neutral.

**Factor 2 (Trial Date)**—While the Court set April 11, 2022 as a placeholder date for trial, it is far from certain whether the '199 patent will be part of that trial

because "the Court does not intend of trying all 12 patents in one trial." EX1105, 1. The parties were already informed that the Court currently has no intention of consolidating any of the twelve separate actions, and it is simply not possible to conduct twelve trials all starting on April 11, 2022. *Id.*; EX1106, 1. While the Court "*may*" consolidate a subset of "certain patents" among the twelve, there is significant uncertainty as to whether the '199 patent will be part of that subset and whether that subset will be the subject of a jury trial starting on April 11, 2022. EX1106, 1. The only certainty at this time is that a significant number of the 12 patents will not be part of the April 11, 2022 trial. EX1105, 1. And the only plausible solution is to spread the trial dates out over a period of time, which will almost certainly result in later trial dates in multiple cases. Presently, there is no hint as to how the scheduling shuffle will play out.

The *Fintiv* panel noted that the Board "generally take[s] courts' trial schedules at face value absent some strong evidence to the contrary." *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 15, 13 (PTAB, "informative," May 13, 2020) ("*Fintiv II*"). For the reasons detailed above, such "strong evidence" exists on this record. Due to Patent Owner's litigation tactics, neither the Court nor any party knows which one of the twelve asserted patents will be the subject of the trial starting on April 11, 2022. There is, in effect, no *certain* date for a jury trial that specifically addresses

the ’199 patent.

The “informative” guidance in *Sand Revolution* aligns with the facts of this case. *Sand Revolution II, LLC v. Continental Intermodal Group*, IPR2019-01393, Paper 24, 8-10 (PTAB “Informative” June 16, 2020). Even if the ’199 patent was selected as the particular patent for a jury trial on April 11, 2022 (mere speculation at this time), the narrow gap in time between the Court’s placeholder trial date (April 11, 2022) and the Board’s projected Final Written Decision (June of 2022) is just two months. The panel in *Sand Revolution*, also facing meaningful questions of uncertainty about the trial date, weighed Factor 2 “marginally” *against* denial with a three-month time gap. *Id.* The *Sand Revolution* guidance demonstrates the proper result when the district court’s “evolving schedule” makes it “unclear” when the trial would be held. *Id.* A similar lack of clarity exists in this case but for a slightly different reason—the placeholder trial date is plainly overbooked several times over, and there is significant uncertainty as to whether the ’199 patent will be addressed in the April 11, 2022 jury trials or one of the inevitable later jury trials.

Similarly, the Board’s analysis in *Google LLC, et al. v. Parus Holdings, Inc.* is compelling. *See* IPR2020-00846, Paper 9 at 12-14 (PTAB Oct. 21, 2020). There, the district court reserved a broad range of “predicted” trial dates but declined to specify further. *Id*. (noting a trial date range of July 12-30, 2021, and further noting

the court's statement that it was "not going to pick a date right now"). With "only three months" between the range of trial dates and a final written decision, the Board deemed Factor 2 "neutral" based on "substantial uncertainty in the Texas court's 'Predicted Jury Selection/Trial' date." *Id.*

The two-month time gap presently at issue is narrower than *Sand Revolution* and the trial date uncertainty is comparable to *Google v. Parus*. The well-reasoned analysis by the Board in those two cases weighed Factor 2 either against denial or neutral, respectively. A similar outcome is appropriate here.

**Factor 3 (Investment)**—The Related Litigation is currently in its infancy. Petitioner has yet to serve its preliminary invalidity contentions, and the parties have yet to exchange proposed terms for construction. Petitioner acted promptly in response to Patent Owner's identification of asserted claims in preliminary infringement contentions, filing this Petition only about seven weeks after the asserted claims were finally revealed for the twelve asserted patents. *See* EX1101, 8, 14.

At the projected date of institution (June of 2021), the fact discovery period will be just past the quarter-way mark, and expert reports still about five months out. *See* EX1103 (*Markman* hearing set for April 15, 2021); EX1104, 9-10 (30-week fact discovery period opens one business day after *Markman*). Beyond a *Markman* order,

which is not dispositive here because the Petition does not rise or fall with any specific construction, the Court will almost certainly have not issued any substantive orders relevant to validity over the prior art.

The facts here compare favorably to *Fintiv*. In that case, also co-pending with litigation at the Western District of Texas, the petitioner filed *five months* after receiving preliminary infringement contentions—less than *two months* here. *See Fintiv II* at 9. There, "[a]t the time of filing the Petition, the parties were in the midst of preparations for the *Markman* hearing," while here, the parties have not even exchanged terms. *Id*.

The "informative" guidance in *Sand Revolution* is telling here too. By the time of institution in this proceeding, the Related Litigation will be at a similar posture where "aside from the district court's *Markman* Order, much of the district court's investment relates to ancillary matters untethered to the validity issue itself." *Sand Revolution*, IPR2019-01393, Paper 24 at 10-11. The parallels are also notable because "fact discovery is still ongoing, expert reports are not yet due, and substantive motion practice is yet to come." *Id.* at 11 (internal citation omitted). Given the alignment with *Sand Revolution*, Factor 3 should weigh "only marginally, if at all, in favor of exercising discretion to deny." *Id.* Alternatively, it is reasonable to characterize this factor as firmly "neutral" given Petitioner's even greater diligence in

preparing this Petition as compared to petitioner in the *Fintiv* decision.

**Factor 4 (Overlap)**—Factor 4 strongly supports institution. Petitioner stipulated in the Related Litigation that, if the IPR is instituted on Grounds 1(A)-2(C) in this proceeding, Petitioner will not pursue in the Related Litigation the same Grounds 1(A)-2(C) from this IPR *nor any other possible prior art printed publication grounds based on any reference* from Grounds 1(A)-2(C). EX1102. Petitioner's contingent stipulation removes the possibility of the Board deciding prior art issues that overlap with invalidity grounds in an earlier jury trial (if any). Critically, this stipulation is significantly broader than what the Board favorably considered in the informative *Sand Revolution* case. *See* IPR2019-01393, Paper 24 at 11-12.

**Factor 5 (Parties)**—Because the parties here and at the District Court are the same, Factor 5 favors denial if trial precedes the Board's Final Written Decision and favors institution if the opposite is true (due to the 35 U.S.C. 315(e)(2) estoppel provision). *Google*, IPR2020-00846, Paper 9 at 20-21 ("[W]e decline to speculate as to whether we are likely to address the challenged patent before the Texas court. Thus, [Factor 5] is neutral."). Neither circumstance can be confirmed in this case without improper speculation because the *actual* date of a jury trial involving the '199 patent is uncertain. For the reasons detailed above, the District Court has only established

a placeholder date for an entire set of twelve patent lawsuits, along with an explanation to the parties that "the Court does not intend of trying all 12 patents in one trial." EX1105, 1. Under these unique circumstances, Factor 5 is neutral.

**Factor 6 (Merits and Other Circumstances)**—The merits of this Petition are particularly strong. Section VII-XII above presents grounds based on two different primary references (Rudolf and Chen) against the Challenged Claims. As discussed, the prior art and arguments at issue here are materially different from those considered by the Examiner during prosecution. The strength of the merits alone is enough to outweigh any inefficiencies born of parallel litigation. *See Fintiv* at 15.

And there are additional circumstances that also favor institution, such as the effect on "the economy [and] the integrity of the patent system." *Consolidated Trial Practice Guide* ("*CTPG*"), p.56 (quoting 35 U.S.C. § 316(b)). Relevant to the former, Patent Owner, an entity specializing in patent licensing and negotiation, is asserting the '199 patent's overbroad claims against Petitioner's network equipment that implements one of the most well-known and widely-adopted standard protocols for wireless communications—LTE. *See* EX1008, 4-16. Fully vetting a sixteen-year-old patent (filed 2004) only now alleged to cover use of a pre-existing standard that the public has come to rely on would be beneficial to the economy.

The integrity of the patent system equally weighs in favor of institution. The obviousness analyses in this Petition show that the ’199 patent’s Challenged Claims are too broad, and the dubious prosecution record does not adequately explain why the Examiner issued a Notice of Allowance in the first place (*see supra* Section XIII.A). AIA trials were intended to “improve patent quality and limit unnecessary and counterproductive litigation costs.” *CTPG*, p.56 (quoting H.R. Rep. No. 112–98, pt. 1, at 40 (2011)). This case provides an opportunity to fulfill those objectives. The quality of the ’199 patent would undoubtedly be improved by cancelling the unpatentable claims presently under challenge. And such a result could avert future litigation (and licensing) costs caused by Patent Owner’s continued assertion efforts.

For all these reasons, Factor 6 and the *Fintiv* Factors as a whole strongly favor institution.

## XV. CONCLUSION

Petitioner requests that IPR be instituted on Grounds 1(A)-2(C), and submits that all Challenged Claims should be found unpatentable.

Respectfully submitted,

Dated: 11/30/2020

(Control No. IPR2021-00227)

/Nicholas W. Stephens/
Nicholas Stephens, Reg. No. 74,320
*Attorney for Petitioner*

## CERTIFICATION UNDER 37 CFR §42.24

Under the provisions of 37 CFR §42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *inter partes* review totals 13,827 words, which is less than the 14,000 allowed under 37 CFR §42.24.

Respectfully submitted,

Dated: 11/30/2020

/Nicholas W. Stephens/
Nicholas Stephens, Reg. No. 74,320
*Attorney for Petitioner*

## CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§42.6(e)(4)(i) *et seq.* and 42.105, the undersigned certifies that on November 30, 2020, a true and correct copy of the foregoing PETITION FOR INTER PARTES REVIEW OF U.S. PATENT NO. 9,084,199, and all supporting exhibits were provided via Express Mail, cost prepaid, to the Patent Owner by serving the correspondence address of record as follows:

Michael Fletcher
FLETCHER YODER (LUCENT)
PO Box 692289
Houston, TX 77069

/Jessica K. Detko/

Jessica K. Detko
Fish & Richardson P.C.
60 South Sixth Street, Suite 3200
Minneapolis, MN 55402
(612) 337-2516